

JULY 1988

THE 555 TIMES

A P A - T E C H 6 0

Ninth Anniversary Issue
(approximately...)

The Amateur Press Association for General Technics

G.T. Buckfast
± Shalmaneser

Greg Ruffa, 10380 Maya Linda Rd., Apt. C-303,
San Diego, Calif. 92126 (619)-695-8647 [to 8/29]

1004 7th St., S.E., #103, Minneapolis, Minn. 55414
[after 9/1/88]

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plus!!! FREE rainbow rocket sticky-thingies (while supplies last)

The minimum required activity is two pages every four months. The copy count has, for the nonce (?), been reduced to twenty (20).

The deadline for APA-TECH 61 is Saturday, October 1st (let's all be there!).

Hugh Daniel has dropped out of sight again. I don't know at the moment if anyone is low on funds or "bankrupt," so why not send some money if you're unsure?

ROSTER

Andy Anda & Annette Kavanaugh (42)	600 University Ave., #307, Minneapolis, Minn. 55414 (612)-623-3378
Guy Consolmagno (47)	200 High St., Easton, Penn. 18042 (215)-252-5020
Gabe & Audrey Helou (61)	2691 Roundtree Dr., Troy, Mich. 48084
Barry Gehm (55)	1400 E. 55th Pl., Apt. 212, Chicago, Ill. 60637 (312)-643-5828
Bill Higgins (17)	853 Lorlyn Dr., Apt. 1E, West Chicago, Ill. 60185 (312)-293-1050
Valli Hoski & Joachim Schurmann (13)	Via Gen. Guisan 21a, 6830 Chiasso, SWITZERLAND
Bonnie Jones (43)	5136 W. Agatite, 3rd floor, Chicago, Ill. 60630 (312)-736-2561
Dave Levine (26)	117 N.W. Trinity Pl., #37, Portland, Ore. 97209 (503)-224-6427
Linda Struwe-Matsushita (51)	2-15-1 Kosobe #302, Takatsuki, Osaka 569 JAPAN
Dave Powell & Susannah West (29)	P.O. Box 98, 501 Main St. , Ripley, Ohio 45167 (513)-392-4549
Donna & Tullio Proni (19)	530 W. Walnut St., Kalamazoo, Mich. 49007 (616)-342-4967
Greg Ruffa (11)	1004 7th St., S.E., #103, Minneapolis, Minn. 55414 (9/1/88)
Rod Smith (7)	730 Cline St., Frankfort, Ky. 40601 (502)-227-7741
Bob & Connie Trembley (56)	11542 Roxbury, Detroit, Mich. 48224 (313)-526-0747
Guy Wicker (32)	30437 Fairfax, Southfield, Mich. 48076 (313)-647-1820
Rolf Wilson (28)	511 W. Hill, Champaign, Ill. 61820 (217)-ELYSIUM

The number of contributions that showed up here for July was pretty spare. Coupled with the fact that I was hardly here at all last month, I am putting together this our Ninth Anniversary Issue now. It is pretty plain, as my rejoinder to those of you who lament the return to bimonthly publication, that this APA can't sustain a monthly rate at present. I am taking this opportunity to shift the deadlines back to the even-numbered months (some of the odd months, such as January, are bad times for me) and to cut the copy count to twenty (20) for now (I've been drowning in extras). I again wish to encourage some of you to write more often (a few of you are teetering on the Brink) and to ask all of you to recruit new folks to join us. I've decided to continue as GTB until at least our Tenth Anniversary (wouldn't want to miss it...). Some good news: **Pyrotechnics** is being revived in Chicago. Write! Draw! Enjoy the rest of the summer!

GTB

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active

inactive

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|--------------------------------------|------------------------|
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| | 2 - Mike Sestak |
| | 3 - Mike Bentley |
| | 4 - Renee Sieber |
| | 5 - Alice Bentley |
| | 6 - Dick Smith |
| 7 - Rod Smith | |
| | 8 - Steve Johnson |
| | 9 - Bill Colsher |
| 10 - (Tullio Proni) | |
| 11 - Greg Ruffa | |
| | 12 - Gordon Garb |
| 13 - Valli Hoski / Joachim Schürmann | |
| | 14 - Clyde Jones |
| | 15 - Angel Insley |
| | 16 - Alex Ellingsen |
| 17 - Bill Higgins | |
| | 18 - Jamie Hanrahan |
| 19 - Donna and Tullio Proni | |
| | 20 - Doug van Dorn |
| | 21 - Bill Leininger |
| | 22 - Mary Lynn Skirvin |
| | 23 - Kevin Dunn |
| | 24 - Kip Williams |
| | 25 - Marty Franz |
| 26 - Dave Levine | |
| | 27 - Bill Roper |
| 28 - Rolf Wilson | |

June 1980

- | | |
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| 29 - Dave Powell / Susannah West | |
| | 30 - Gretchen van Dorn |
| | 31 - Robert Osband |
| 32 - Guy Wicker | |

- 33 - Martha Soukup
- 34 - Jon Singer
- 35 - Gerald Corrigan
- 36 - Paul Gadzikowski
- 37 - Jeff Sekiya

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- 38 - Al Duester
- 39 - John Frambach
- 40 - Clif Flynt
- 41 - Gail Matthews

June 1982

- 42 - Andy Anda / Annette Kavanaugh
- 43 - Bonnie Jones

- 44 - Hugh Daniel

June 1983

- 47 - Guy Consolmagno

- 45 - Sam Paris
- 46 - Charles Galway

June 1984

- 51 - Linda Struwe- Matsushita

- 48 - Roxanne Meida
- 49 - Nikki Ballard
- 50 - Dean Anton Sherwood

June 1985

- 55 - Barry Gehm
- 56 - Bob and Connie Trembley

- 52 - Sheila Groves
- 53 - Eric Roman Nash
- 54 - Kiran Wagle

- 57 - Steve Salaba

June 1986

- 58 - Lee Hart
- 59 - John Hall
- 60 - Scott Shields

June 1987

- 61 - Gabe and Audrey Helou

CRUMBCRUNCHERS
Inc.

Dave Powell & Susannah West
P. O. Box 98
Ripley, OH 45167
513-392-4549

WAYFARERS ALL

CORVALLIS, OR - Well, here Marlene and I are, sans Mac, Tandy or typewriter, exploring the Pacific Northwest. Actually, we are out here to attend a gala bash - my aunt and uncle are celebrating their 50th wedding anniversary. So far we have experienced: Marlene's first airplane rides, first meeting with innumerable cousins, first sight of the West Coast, first visit to a strawberry plantation to pick berries, etc. I've had my first meeting with some cousins too (actually cousin's children). Also the first time I decided to check my luggage rather than carry it with me on the plane - and of course it got lost. Fortunately, it was not irretrievably lost - it just arrived several hours after I did.

We are also sans David, who decided regretfully that he couldn't come along. See this space next month (or rather the month after next) for a run-down on our adventures.

We are recently returned from Washington, D. C. where Dave attended a conference. Did you know that it's possible to "do" the Air & Space Museum in less than an hour? Just take along a few children under the age of 7. (We had three of them, ages 3, 4 and 6 - two of them belonged to Dave's sister Nora.) Most of our sight seeing was done at 2 AM, out of a car window. Marlene's main request was to "see where the President lives".

We, like many of you, I imagine, are aching for rain. We in Ripley have not actually reached the point where we have been asked to conserve water, however. I've made two futile attempts to transplant ground cover into spots in the front yard where nothing will grow. Definitely not the year for such a project!

* * *

On to the mailing comments, which will probably be somewhat truncated!

Gabe & Audrey: Isn't it amazing how important furniture becomes when one gets his/her own place and stops vagabonding it! I've seriously wounded our checking account by recently purchasing a hide-a-bed and a dryer. When we bought the dryer just before Mother's Day, the salesman complimented David on his choice of a Mother's Day present. My question was, if it was a present to me

why was I paying for it?!

Question to ^{my} Dave: What would you do if you won the lottery?

Answer: Buy more computers, of course! Question: If you bought that 19th century house with the ballroom on the second floor, what would you put in there? Answer: Computers, of course!

I should say "Welcome" to you folks, as I haven't done so before.

Valli: The "Ripley's Alive at 175" was done using a printer with colored ribbon. Ripley's wealthy eccentric, whom I've mentioned previously, created the stationery.

Do people's teeth start to fall apart after they turn 30?! Our dentist recently discovered a fractured tooth in my mouth, and in trying to shore it up, broke half of it off. He says I need to have a crown; needless to say, what I have right now is only a huge filling. I could have gotten it fixed, and more, with what I've spent on dryers and couches and curtains!

Annette: Dave's baby brother (who is about 20, I think, and who just finished his second year at Ohio State) has announced that he's getting married in August. (Considering the opposition Dave and I encountered when we announced that we were getting married - I was 30 and Dave 25 - he may wish he kept his mouth shut!)

I am lamenting the appearance of several gray hairs also. Unfortunately it doesn't make me look distinguished, just as if I got paint in my hair while house painting, and haven't washed it yet.

Bill & Barry: How many people remember Heinlein as the author of the first science fiction novel they read? I imagine that it's more than a few! My first was Stranger in a Strange Land when I was 12. Dave says it was a Heinlein juvenile novel that first really sparked his interest in reading when he was in fourth grade.

When I'm reading a piece of SF, I'm always drawn to it more if it evokes an emotional response. Often this means that it makes me cry! The Door into Summer does this to me every time. Especially the scenes with Pete the cat. Dave says this is because I'm a sucker for cats.

Well, more relatives whom I have never met have just arrived, so I will say: Be well, and be happy.

Susanna
E
R M N (Marlene)
Rachel

Dr. Gonzo's ...

More ellipsical statements ... from Valli Hoski of Via Gen. Guisan 21a, 6830 Chiasso, Switzerland, and officewise (011) 39-2-623418 for any silly or serious reason. For ApaTech 60 around July, 1988 being written from mid-May, 1988, with hopefully more up-to-date news rather than reprints.

As I write this, Milan is warming up quickly to the days of summer. The green is still fresh but will dry quickly as July draws near. The tourists have begun to arrive and one hears English spoken more and more in the train station and cafes.

Thank--you--mille-grazie--donkey-chains--and--mucky-buckets--too!

Right here on front page news I want to thank some really sweet guys in Chicago. Ok, so you know who you are. But just so everyone else does too, thanks, thanks and more hugs to Bill (S. Higgins) and Barry (? Gehm) who have both entertained and hosted me regally (...like kings...ahem) during my recent trips to Chicagoland. Bill has consistently come through even as I've bungled plans, schedules and appointments, and has courteously met me at the airport, gone with me for dinner +/o ice cream and provided space in his den/computer room/perpetually-visiting-friend room. Barry has also cheerfully provided space for me, my luggage and our mail, and more importantly, his company, great humor and nice neckrubs. And there are the host of others, like Todd and Mary Lynn, who take the time to pass a pleasant evening reminiscing, catching up on news and generally making me feel at home again. Thanks folks, all of you, for so gracefully sharing your time with me and welcoming me back each time.

Mad Modern Music in Milan....of a spring evening

One mid-May evening Joa and I went to a concert which included the use of synthesizer equipment for electronic music. This concert was in cooperation with a seminar being held on developments in electronic music at the state university in Milan. Several modern pieces were composed and premiered especially for this event. Although perhaps perfect examples of modern atonal compositions, the pieces were too radical for us. The use of the instrumentation was interesting, but the music did not contribute much to our understanding or appreciation of the technology.

This type of synthesizer electronics is the same used by my friend Nathan in his musical compositions. However, he is less radical than the music we heard. He uses both classical and popular themes but they are on the usual 8 point scale, for the most part. Yes, I definitely prefer his compositions to those we heard last night.

The location of the concert was stunning. It was in a renovated grand hall of the centuries old Milanese hospital, now part of the main university buildings.. This great hall was around at the time of the Black Death plague. Long wooden beamed aisles, with a central dome supported by brick arches. Illuminated with 20th century halogen strips that appear like sunlight pouring through the high windows. Quite an impressive mix of historical edifices and modern technology.

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Trout-Fishing-in-Italy...

One weekend between my trips, Joa and I did find a wonderful place in the mountains. Northeast of Brescia up in the Alps. Brescia is a wonderful small city, full of tree-lined streets that remind me of Paris. It's much more provincial than Milan. And smack in the middle of town is a small mountain with a castle on it, more rounded and green than Edinburgh's. So we went northeast into the mountains, following local roads. We managed to find a local place to have dinner, by following vague signs and directions given by locals. We ended up at this local inn type place right on a mountain river with fisherman. Not surprisingly their specialty was fish, and I will say that the grilled trout I had there was the best I can recall having had. Also the place was full of locals which is always a good sign. We inquired as to the rooms, and at \$10/person per night, we decided to stay. This is Joa's kind of dream---to wake up in the morning, open the windows and see the mountains and light all around you. The next day we walked around a bit, drove back through the mountains and onto our more mundane tasks. But this place is definitely ours and definitely a treasure.

And now...fresh-from-Cracow...it's Marek (and his Polka-Boys) Ragtime Band!

Alpine mountains, a glacial lake, green pines stretching up the hillsides as far as one can see, a summer breeze and a blue sky. In the background, jazz and ragtime rhythms set your feet tapping. In the foreground, the narrow, cobblestoned streets, crowded buildings and pristine cleanliness of a midval Swiss town center. Yes, here we are at the New Orleans Festival in Lugano Switzerland.

One advantage of the festival being in Switzerland is that bands can come from quite literally anywhere. Read that anywhere as in West (USA), North (Germany), South (Italy) and East (Poland and Hungary). You really have an opportunity to hear jazz's international appeal and communication.

You've never heard jazz until you've heard 5 guys from Cracow belting out "Sing, Sing...", ala chorus line style. Or playing their horns so sweetly for "Sentimental Journey". They play tight and they play loose. If you don't laugh until you cry at their chorus line routine (grind those hips, boys!), then your heart will break at their jazzy brass renditions. How can they play so well and not ever have set foot in the bayous?

Then there is the Italian version of jazz playing, complete with plumber's friend being used as a horn muffler. (You know, those things they use inside the horn instruments to muffle and waffle the sound?) But they do know how to put on a slick performance...

Incidentally, I did resist my better urges and didn't request the Beer Barrel Polka from the Cracow band. I really did want to give them the new words, though. Isn't it true Glasnost to tell Mikhail to "turn off the G-force...?"

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What I might do on my summer vacation...

As seems now usual, I returned to Milan just as Mr & Mrs Schurmann were leaving for Germany. They will be there about 1 month looking after things. Joa was thinking that we could go north to Hamburg for part of August, the most torrid time of year in Milan. I suggested that we go MAY north, as far north as the trains go in Scandinavia. In fact, I think it might even be farther north than the Arctic circle. No we won't need sled dogs, remember this is summer. But the train ride there from Stockholm or Oslo is about 48 hours. There are 2 other places I might like to see while I am in this part of the world: Leningrad (St. Petersburg) and Jerusalem. Joa suggested that we could go on a brief visit to Leningrad from Scandinavia. If so, it would be best to be part of an official tourist group. Visas, etc. are much easier if one is a registered group member, I believe. Also, I am not very comfortable with the idea of touring unescorted in Russia. Europe yes, Yugoslavia maybe, Russia no. To go to Israel in the summer is like going to Florida in mid-August; you must like the heat. Actually, it's more like Arizona, with all the surrounding desert. October or February are more likely times to enjoy Israel. One additional problem is that you have to fly there, as there aren't any feasible overland train routes. However, these are just plans.

[Note: this is stuff on Frank Lloyd Wright and is optional reading.]

Wright Plus 1988

What did I do in Chicago on my visit in May....ah yes, there was the annual Wright Plus housewalk. Peter and I toured the homes on Friday's preview night as has become our tradition after 3 years. He usually enjoys seeing them and appreciates their architecture. We also went to a local ice cream parlor (Peterson's in Oak Park), as we have for 3 times now. On Saturday I volunteered at the housewalk itself, and spent part of the afternoon guiding people on and off buses. The homes were exceptionally far between this year, spread over 3 suburbs and about 4 miles. This necessitated the use of tour buses to move the crowds. Somehow this year the people seemed friendlier than usual. The weather was exceptionally bright but also cool, terrifically comfortable for such an extended outdoor event.

Next year is the Home and Studio's 100th anniversary and they are planning another gala tour, like 2 years ago at the foundation's 10th anniversary. Two tour days instead of one, and even more houses. And I am sure that it will be coordinated marvelously, as always. You would not believe the amount of person-days that goes into planning, preparing and running an event like this. This year alone, I think over 400 volunteers were involved from traffic coordination to selling souvenirs to directing people to the bathrooms as well as (of course) giving the tours. This is in addition to the year-round tours offered of the Home & Studio, Unity Temple and the Oak Park historic district. There are only about 12 paid employees of the foundation, 3 for tour coordination, 5 for fundraising, publicity and other administration and 4 for architecture. I think the Home & Studio foundation is a unique and outstanding mixture of committed, enthused and lively people.

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During a recent visit to Arizona, my mother and I toured Taliesin West, home of the Frank Lloyd Wright foundation and the Taliesin Associates, remaining. FLW architectural group. The tour we received was lean on data acceptable but without relevance to Wright's overall life, philosophy or works. Sure Taliesin West is an ongoing commercial concern, rather than research and museum piece, but that's even more reason why they should livelier and friendlier than the Oak Park folks.

[Note: these are more travel war stories. Again, optional reading.]

As I float through the air with the greatest of ease....

I sure hope United or Delta has a worthwhile frequent flyer bonus program. I'll have enough points to do something soon. Due to business and program requirements, I've taken 4 transatlantic trips in as many months. But I can recommend Swissair as the most reliable and court airline for business travel. Lufthansa has a good reputation but has service quality due to overcrowding at its Frankfurt facility. (I was stuck up there on one flight; with the grumbling service I was reminded of domestic flight and certainly not Lufthansa.) Air Canada also had excellent service last autumn, but it doesn't go to the cities I most frequently need to go to.

Well, my most recent return flights have gone much better than average. I was probably helped by the fact that I fell asleep at about takeoff time, up above Montreal for dinner, another time above the English Channel and for breakfast above France. I don't even remember the flight that was shown on board. I'm not sure I've slept so steadily on a flight before. It was great. As a result, the readjustment here has been much easier and I'm not waiting at ungodly hours. I guess the secret is to be very occupied before leaving and catch up on sleep during the flight.

I've been transatlantic so often that even Alitalia (yes, that Always Late Travel, Always Late in Arrivals Alitalia) has beaten its infamous reputation service (or lack thereof) by getting me on my June 4 flight when I showed up the ticket counter 15 minutes before an international departure. Well, I got my Swissair ticket was as good as the proverbial Swiss gold, as Alitalia it, my baggage and me in hand, whisked me past the gate and drove me out to the plane. I boarded in a bit of a flurry with another late passenger, but didn't take off for another half hour. (Guess they couldn't find any last-minute takers for the seats.) I even got a great seat, right in the middle of the 747 next to the non-smoking section, where I got settled, stretched and promptly fell asleep. I pulled another one of those "woke up over Montreal for dinner, over the English Channel for breakfast and slept through the rest of the flight" numbers. Actually it is quite amazing that I could relax so well, considering it was Alitalia after all. While the food and service are better than Swissair, the 9 hour convenience of this flight (versus my usual 14 hours via Zurich) makes Alitalia about the same. More likely, Murphy just got out sick that day and the next time I take Alitalia it will be normal.

May/June 1988

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

via Gen. Guisan 21a, 6830 Chiasso, SWITZERLAND
via Raff. de Grada 10, 20125 Milano, ITALY

I am very pleased to see how many of us responded in the same way to the same cue: APATECH shall not die! Number 59 proved it: 380 grams of fun filled entertainment. How big will our anniversary issue be?

When I heard about the "choice" of Donna Proni, I have seriously considered to offer running the APA out of Switzerland. The offer still stands, although I think it is more efficient and cost effective to have it based in the USA, since that is where most of our members are. Thank you, Greg.

About better and faster trains

During my last trip to Rome I was unable to get a suitable plane reservation for my return trip, so I chose to take the new bullet train (ETR450). Starting May 29 this train provides a new link between Italy's two largest cities: Rome and Milan. Direct connection, no intermediate stops.

The distance between these two cities is 632 railway kilometers. A normal express train (InterCity) with stops in Bologna and Firenze, requires little more than 5 hours to cover this distance. The ETR450 is advertised as requiring only 3 hours and 58 minutes. Since this is about an hour less than any other train, it is quite a temptation for the business traveller.

The cost of the ticket is about 20% less than the equivalent airfare. This is very high for Italy, where one can expect a train ticket to cost less than 50% of the equivalent airfare. But the frustration level is also lower, since travelling to and from the airports is generally time consuming and difficult. Nothing beats a direct link between downtown Rome and downtown Milan. Also, in spite of the flight time being only 50 minutes, I would never plan on less than 3 hours to reach a point in downtown Milan by plane from downtown Rome. And in many cases, traffic congestion and other little problems make the travel time even longer. So it was not with little expectation that I started the trip with the new train.

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

The ETR450 is built in Italy, mostly by FIAT. The train is a six car unit with a driver cabin on both ends. It is electrically powered and has two motors in each car. Its outside is shaped very aerodynamically. It can reach top speeds of 260 kilometers / hour. Its inside looks very much like a passenger plane; however it is only three seats and an aisle wide. I estimate a capacity of about 50 to 60 people per car. All but the end seats of a car are reversible and can face forward or backward. The passenger compartment is also hinged in order to compensate for centrifugal forces when the train swings around curves.

This last gizmo is probably the most peculiar one, in particular on the curvy stretch between Rome and Florence. It's like looking out of the window and going "Oh, it's a hill". But then the attentive observer will note that the farm houses are not build perpendicular to the perceived gravity source but perpendicular to the surface of the "hill". It is even more interesting to be in the bathroom or anywhere else outside the seating area when the train goes high speed around a curve. There it is possible to hear the pneumatics work: it sounds like a ride at an amusement park.

The train ride itself was interesting. Activity was not yet settled down to a routine. The Italian Railroad tried very hard to create a pseudo airplane ambience; I guess this is their way to justify the expensive ticket. They even served food. However ice-cold eggplant parmesan is not my idea of a gourmet dinner.

On a ride like this I won't spend my time sitting in my seat. So I walked around and ultimately ended up at the head of the train, from where I could see the driver's cabin. I saw rather complex instrumentation, much of it digitalized and computer driven. Three people were in the driver's cabin. One person was driving. The second person doublechecked the driver and the signals. The third was reading a detailed map of the area travelled, as it is used by train men in Italy. From time to time he sang out the location, maximum allowable speed, expected signals and track limitation. It sounded like this: "Station of MONTEVARCHI approaching, two signals expected, blow horn twice in acknowledgement, maximum speed one-one-oh, accelerate after MONTEVARCHI, no further obstructions for the next 5 kilometers."

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

I was reminded of Mark Twain and his Mississippi boats. Of course I ended up asking what was going on. Everybody was very friendly and eventually they explained: all vital functions of the train are computer controlled, and the information on the rail map is stored in computer memory. However, one didn't quite trust the computer yet. Thus they were running in manual overdrive, letting the computer run parallel and observing the computer driven gauges to determine whether the computer would have acted correctly.

This discovery gave me a real warm and fuzzy feeling. After all we were only system testing with a crowded train at 250 kilometers / hour.

I think I might have scratched my head and moved away. During further wanderings along the train I eventually ended up at the other driver's cabin, currently facing backwards. I found that there was a single gentleman in it, a lonely and abandoned technician, as he put it himself. All the gauges were connected to the forward facing driver's cabin and were therefore showing what was going on, but none of the command levers were live. We chatted for a while. In particular I found it interesting that the train had a "resident technician". I learned that all the subcontractors had crosstrained people and were rotating them now as to have always one support person on board in case something should go wrong. As the technician himself put it with a grin, pointing to his tool case: "We may arrive late, but by Jove, we won't get stuck".

We didn't get stuck. And we were late. Not much, though, which is indeed reassuring. Like many other people I was watching the time when we approached Milan. By now I know the run times from the little stations at the outskirts of Milan to the downtown Central Station. We beat them all. With a tremendous priority we thundered through the suburban train yards. All other traffic literally stopped dead in the tracks when we arrived. We still didn't make it on time: four minutes late. A pity for the PR men of the Italian Railway who want to claim the psychological advantage of having a "less than four hour connection between Rome and Milan". However a tremendous technological achievement and qualitative leap for a Railway Service which for many years has been trying to emerge above mediocrity.

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

About books and Science-Fiction

In my previous essay I have explained what Asimov's Caves of Steel has meant to me when I was a youngster. This time I would like to talk about the most impressive Science Fiction I read in my youth, at a time when I already knew the difference between Science Fiction and other literature, but had not quite discovered how important it was to me.

I might have been around sixteen years old. For some reason or other I was hanging out in the district library, close to our summer home in Hamburg, Germany. I have a habit of picking up books randomly, opening them at any page and start reading. That day I found a story that thoroughly fascinated me, almost brainwashed me for many days to come. It was written in German, and I do remember the German title: It was called "Der Kreis", ie. "The circle"; an extremely apt title. As I often do, I promptly forgot the author. I didn't forget the story, though, and all its mind boggling implications. I often wondered how I could go about finding it again.

Many years later, in the States, I found it again by chance in "Adventures in Time and Space", a Ballantine Book, Copyright. 1946, Printed 1975. This book is an anthology of Science Fiction stories by various authors and is very dear to me. Luckily it survived the 1987 flood in Chicago.

The story's title is "By his Bootstraps", by Anson MacDonald. I have never seen anything else written by this particular author. But this story earns him my recognition and admiration. I am not going to give you an abstract of this story, because that would spoil it for those of you who are going to read it. But I will quote the preface to the story which the editors of the collection mentioned above saw fit to use:

This is literally a "whodunit". There are four or five characters in this story (or puzzle) and most of them are the same man! The question is who is who - and when. Or, when is a man not himself - yesterday, today or tomorrow? It may sound like a joke, but we assure you it isn't. It is a perfect illustration of the paradox of time travel. If the story's problem can be solved, then (perhaps) so can time travel.

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

I think I can claim that this book was the beginning of my Science Fiction awareness, and, in a way, my entry point to GT speculation.

An encounter of the social kind

As I mentioned in my previous essay I had a company apartment in Verona, about 10 minutes walk from the office and 15 minutes walk from the train station. Unfortunately the daughter of the landlord was getting married and since it is customary in this country to give an apartment as dowry, I had to move out.

For the briefest moment my administrative assistant and I thought of conspiring to break the future couple up, in particular considering the kind of "fine gentleman" who would be the groom. However we reconsidered and decided that this action would not be socially acceptable.

In fact, I met the young couple in a very interesting way. One Saturday(!) while I was in my home in Verona, the bell rang. Since I was not expecting anybody, I tried to ignore it. The ringing insisted. Ultimately I went downstairs to investigate the interference and found a young lady and a young gentleman who wanted to speak to me.

The gentleman told me that he was going to order custom furniture for his apartment and therefore would need access to it during the next week. In a way I couldn't have cared less, but this fine chap was trying to land a "macho" attitude with me with his spouse-to-be at his side.

I am not a missionary that finds it necessary to correct anybody's attitude toward life. But I definitely take it up with jerks who get on the wrong side of my philanthropy. Executive life in Italy does teach a certain awareness to these things.

The one thing that was wrong with the chap's statement was his matter-of-fact attitude toward the ownership of this apartment. So, he was going to marry the young lady in a month or so and was already making dispositions regarding her dowry, in particular identifying himself as the "landlord" and calling the apartment "his" apartment. I knew for a fact and with certainty that the apartment was still owned by an elderly couple with a daughter, but it was not difficult to imagine what was going on.

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 ** DER MANN VON DRÜBEN **

 *** by Joachim Schürmann, HB9/KA9WGP ***

Just to avoid possible misunderstandings I asked the gentleman whether he was the landlord, and when he said yes, I had him where I wanted him. I told him that I knew the flat to be owned by an elderly couple, and could therefore not accept his misrepresentation. I would do business with the owners using the proper channels. Thank you and good bye. I essentially called him a liar; a century ago this would have cost me a duel.

I am sure this gentleman was confident that he would have walked out of this meeting with the keys to "his" apartment in the hand, and I essentially emasculated him in front of his bride-to-be. He was livid with rage and unable to shut up, but I guess his upbringing did not teach him the proper formulas to deal with this situation. When I saw this bumbling fool I decided to land another coup.

I asked the young lady whether she was the daughter of the landlord and she said yes. Please realize, that given the relationship of the couple, this may have been the first time that the young lady uttered a statement which contradicted her future husband. I decided that the lesson was catching on well, and proceeded to talk to the young lady. The chap tried to break in and interrupt until I told him to either shut up or go away, since I was talking to "this young lady". His interference visibly diminished. I think he understood that by insisting he would have made the situation only worse.

The young lady was quite capable of expressing her own opinion and to speak for herself, if given half a chance. Charminglly I agreed that I would have nothing against them entering the apartment next week to make measurements, but unfortunately I did not have a key to spare, and whether she could kindly use the key of her parents. We agreed, including, and very deliberately so, the groom to be, and parted all as friends.

And the moral of the story? First a glimpse of the obvious: if the lady would have chosen to follow "proper" etiquette, she would not have dealt with me while I was obviously ignoring her future husband and treating him as a scoundrel and impostor. The fact that she did, tells us that she is indeed a child of her own time, not ready to be permanently pushed into a role of inferiority by an arrogant husband. Now back to the moral of the story: Don't accept arrogance for its face value and give the meek a chance. Italy's social structure is changing, but one has got to help it along, occasionally.

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

I have one more comment to this. I am not a puppeteer who plays people as he pleases. But the social cues I received when I met those two young folks where so overwhelming that I just had to play them. Under the circumstances the chap's arrogance really got me mad. And I do not think that I was cruel at all. I am good enough at playing the social interaction without leaving permanent wounds, but a little bit of scar tissue in that young man's ego may help him to survive after the first year of marriage, when the kids are screaming and the world does not any more lie at his feet.

About travel

I am commuting very often between Milan and Verona. Since I am mostly on the way to a business meeting in Verona or come from a business meeting in Verona, I used to travel in business suit. I hate travelling in business suits. First, it doesn't do the suit any good. And second, it doesn't do me any good, because the suits are hot. They satisfy social etiquette more than comfort, and that makes it desirable not to wear them on long trips.

Now I managed to change that. Our administrative assistant had the overwhelming luck of finding an apartment for me in the same building complex where the office is. It costs me only five minutes to go up there, get changed, and leave. These days you can find me travelling between Milan and Verona wearing long trousers and a Puerto Rican guayabera (short sleeved shirt, worn over the trousers, with pockets like a jacket, and embroidery on the front and the back). I find this particular garment extremely suited to hot weather and do insist on wearing it occasionally on very warm days.

Of course I travel first class, which is the recognized business class in Italy. Around me most other people are still sweating in their business suits and of course I am standing the tiniest bit out of the crowd. However, nobody ever looked twice at me and nobody wondered. As if there were gentlemen with guayaberas on the train all the time. Maybe I'll try a caftan next.

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

What separates the men from the boys?

The other day I found a new answer to that question.

Trains were on strike and the only feasible alternative was renting a car. In order not to get stuck in business traffic on a Friday night I chose to travel the following Saturday, during the day.

Thus I got myself on the "autostrada" (tollway) with my rental car and started to drive from Verona via Milano to Chiasso (200 km approx). No big deal, I have done it before. Not on Saturday mornings though.

The crowd on Friday evenings is a collection of frustrated business drivers and other habitual sinners. They know their vehicle and the road. They drive somewhat aggressively but not recklessly.

On Saturday morning I found a rolling kindergarten. It's halfway to Sunday, so one would expect some Sunday drivers. But the whole crowd of drivers was pushy and frenetic. Like, they rather would have gone yesterday, but since they had to wait they will go today and twice as fast.

There are some construction zones along the road. No particular danger: the road width is just reduced from three lanes to two. Speed limitation 80 Km/h.

Nobody cared. I mean Italians are known for ignoring the rules and driving mostly by common sense. Common sense dictates that on a two lane road there is ample room for everybody and speeds around 120 km/h are kind of ok, independent from any officially posted limitation.

On this Saturday however, I found myself boxed in badly, while driving in a construction area. Two lanes. I am on the left hand lane. A series of trailer trucks on my right, travelling close together at 110 km/h or so. I am passing, probably making around 140 km/h, a comfortable speed for my car. Behind me a van, Swiss car plate, canton Vaud of all places (its drivers are believed to have the phlegm of St. Bernards), about a foot from my bumper. I have nowhere to go, besides forward. How fast do you think a van can go? Well, I don't know, but I figured it may be reaching its limit. I pushed forward then. Well, 150 km/h was about as fast that particular van would go. But I needed manoeuvring space to get out of there and squeeze myself between two trucks on the right hand line.

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 ** DER MANN VON DRÜBEN **

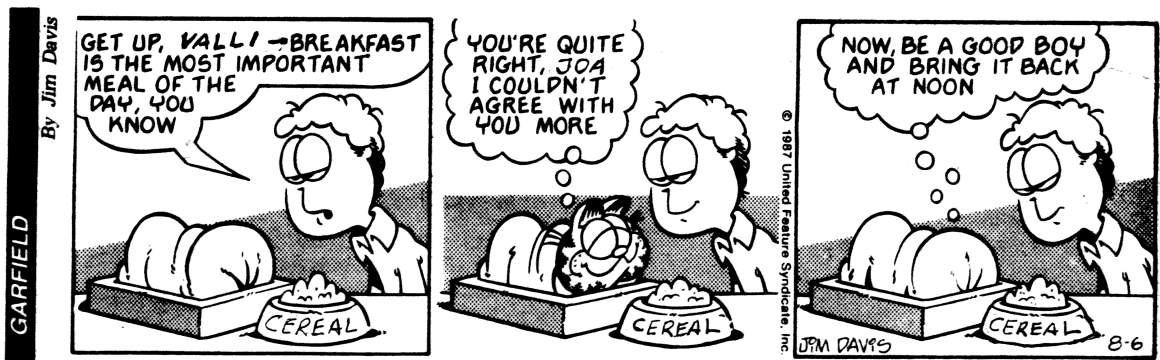
 *** by Joachim Schürmann, HB9/KA9WGP ***

Now I can tell you: Driving a FIAT UNO/45 at 160 km/h through a construction zone, with no room to spare, that is what separates the men from the boys. This car is a city vehicle with 1100 cc. It is not built for this kind of speed. Up to 140 km/h it does ok. But above that it feels like it is trying to take off on a mine field.

I made it alright. I must also pay my respects to the car. I probably abused it terribly, but it sure took it well. Fix It Again Iony? Not this time, not for that weekend at least, may be later.

IF I DON'T STOP WRITING AND GET THIS THING OUT
 I WILL MISS THE DEADLINE.

Before terminating this contribution, please allow me to present you the following cartoon, slightly modified to suit the circumstances:



Take care
 Joachim

Turn Left at Oblivion

an apazine for APA-TECH

Guy Consolmagno
200 High St.
Easton, PA 18042

It has been an enormous amount of time since I have written for this apa, so I guess I had better first apologize for my absence, and thank Greg (and a long steal from the New Yorker last month) for keeping my accounts current.

A few highlights since the beginning of the year...in January, I spent two weeks with Dan Davis and his family (Sarah, who's 4, and Ben, who's 2...and Léonie, his wife and the savior of all our sanities) finishing up *Turn Left at Orion*. We were under an interesting sort of deadline...the book had been dragging out for over a year, so I had made plane reservations for England for the middle of January, to make certain we would be finished by then. We were, but just barely. Anyway, they got me on the bus to JFK, and a mere 12 hours later I was on my way to the offices of the Cambridge University Press. I had written them in October that I was coming...but when I arrived there, I found that my editor was in the US! Oh, well...anyway, I dropped off the manuscript and spent a week in the Lake District (my favorite spot in all the universe, especially in the winter when the fells are covered with snow and the streets are nearly empty. Like most tourists, I can't stand tourists!) Eventually Simon showed up, and chatted for a while about the book...

One result of the trip was that, it was so pleasant being first with Dan's family, and secondly in England, that I began to see just how dissatisfied I was living the bachelor life in Easton.

A month later, I travelled to Pittsburg to visit old Peace Corps friends, who are now engaged. I was delighted to see them...and I also realized that, happy as they were, I did not envy them. Instead, I realized how much I missed the Peace Corps life. Self indulgence is a drag.

Teaching was intense this past term, and it's likely to get even more so. The biggest thing was having two students doing research projects under me. We presented our results at various conferences...two papers at the Lunar and Planetary Science Conference in March, at the Johnson Space Center in Houston, and again at the AGU in Baltimore; and another smaller local meeting at Franklin and Marshall College in Lancaster, PA (home of the

Amish). Got to see lots of old friends from the days when I was a real scientist, publishing 5 papers a year. It felt like living in the past. Once again, I realized how much I hated that life, too. Made me want to up and join the Peace Corps, all over again.

Graduation was on a Friday this year...and in the middle of the student oration I got up and walked out. I had to — I had to catch a flight in an hour's time to Oakland, California. I was off to go to my friend Cliff Stoll's wedding. Cliff and I were best of buddies back in grad school at the U of Arizona; and one of the other people who worked at the Lunar Lab there was Mildred Shapley Matthews, the editor of a whole series of excellent space science books (that all list her boss, Tom Gehrels, as editor). She also happens to be the daughter of Harlow Shapley. Well, when we were grad students, her daughter Martha—who was maybe 13 at the time—developed a terrible crush on Cliff. Martha is now 25, a lawyer interviewing to clerk for a Supreme Court justice, and Cliff's wife.

Cliff himself had his 15 minutes of fame recently. He's the one who tracked down the West German spy that had broken into about 300 defense department computers—it all got written up in *Time* and the *New York Times* last May.

Also saw some old Peace Corps friends out in the bay area. Had the sort of long heart-to-hearts that you best have with old friends. Told them all of my latest mid-life crisis. I know what I want...I want to teach, I want to live in an intellectual community, I want to do somebody some good maybe once in a while...but I don't want a family; I don't want wealth; and I hate being in a position of power over other people. So what's a good practicing Catholic like me to do?

Well, I interview with the Jesuits next month. If they'll have me, I am ready to sign up.

(Actually, I hope I haven't made all of this sound too flippant. It's something I've been thinking about for a long, long time. I hope it happens. And if it does, it should be fun to tell everyone about what *really* goes on behind those closed doors!)

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 ** DER MANN VON DRÜBEN **

 *** by Joachim Schürmann, HB9/KA9WGP ***

 via Gen. Guisan 21a, 6830 Chiasso, SWITZERLAND
 via Raff. de Grada 10, 20125 Milano, ITALY
 via Solferino 42, 20121 Milano, ITALY

Where is APATECH?

I know that the Swiss Mail is better than that! It's August already and APATECH did not arrive. I happened to talk to Barry Gehm at the phone and asked him "Where is Apatech?". He told me that Greg told him that there was not going to be an APATECH for this bimester May / June. Supposedly there had been only one contribution. Well, Valli sent one and I sent one - I guess that counts as one.

Come on folks. If everybody else rather sleeps in than writing zines I take my marbles and go home. I like to sleep in too. If there are however able-minded people out there who like to keep this thing alive, I'll be right up there with them.

And we may survive the Big One yet...

As you may remember, so far Valli and I have lived essentially in two places: Chiasso / Switzerland and Milan / Italy. The place in Chiasso is ours; rented, that is. However in Milan we are staying with my parents, who have a rather large apartment in the city.

Now we found our own place in Milan, too. We have a one year lease on an apartment in one of the best "established" downtown areas. It is less than 5 minutes walk from the office. I's a pity that we almost never work at the office.

The building was erected in the sixties, eighteen-sixties, that is, but has been adequately renovated since then. Indeed, we do have water, toilets and other modern amenities, all in excellent working order. The stairs do work too, without fail. The elevator, however, works only sometimes; this is not a problem, since the building has only five floors.

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

Our apartment is on the fifth floor. It is where the servant's quarters used to be when the building was still patrician housing: right under the roof. It is cosy and comfortable. We hope it stays that way even when it rains.

In our building there is the best wine cellar in Milan. Unfortunately we do not have the keys for it, because it belongs to "Cottini", the first wine store in the city. The store is right in the building. At least we don't have far to walk.

Sub-tenants of the sub-human kind we have not seen yet. Maybe we are not long enough there to be deemed proper company for the native rodent aristocracy. On the other hand, one must admit that the building is of fairly recent construction and may not have a proper establishment yet. My first company apartment in Verona was quite another story. On its doorsteps some condottiero-or-other was assassinated in the early sixteenth century. The blood stains were removed, but the building had not been significantly remodelled since then. Pedigree cockroaches would be greeting one at the door step and keep company whilst in the apartment. After a month of cohabitation I left the apartment to a history buff.

The part of the basement in our apartment house, which is not Cottini's cellar, can be accessed by the tenants. It looks like the crypt of a roman basilica. It is very deep, built in solid terracotta brick which is vaulted in roman arches to support the floors above. The walls of the building are about 10 inches thick. This is true even on the fifth floor. It gives us a very protected feeling. It keeps cool in the summer and warm in the winter. Will it also keep hard radiation out?

August is... driving 90kmph in downtown Milan.

In a city that has the rush hour pattern of New York, being able to speed along the main streets at rush hour time, is a major satisfaction. The next best thing is to cross the streets without having to wait for traffic.


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** DER MANN VON DRÜBEN
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*** by Joachim Schürmann, HB9/KA9WGP ***
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Yes, in August Milan is empty. Almost everybody is "al mare" (at the seashore) or "in montagna" (in the mountains) or elsewhere, but certainly not in the hot, large cities. If somebody needs company, that somebody better go to Rimini or Viareggio. That's where the social life occurs in the summer. In the cities remain only those who have to for business reasons and those who cannot afford leaving.

It is fairly typical that the families stay in resort areas for two to three months, while the breadwinners stay in the cities during the week and commute to the resort areas on the (very long!) week ends. However in August even the breadwinners will try to be in the resort areas. If he (!) is not, one could surmise that he cannot afford it...

That's the tradition. Millenias worth of conditioning. Pompeji and Herculaneum are still a testimony of this tradition. Since that time the width of the social strata that can partake in this tradition has increased considerably, but the desired goal has not changed much.

In order to get aligned with the other more advanced nations, Italy is trying to modify this tradition somewhat. Shops require permission from the "comune" (township) in order to lawfully close for vacation. This is geared to prevent that everybody closes in August. And some of the large companies are reducing the period of time in which they close the factories. That period used to encompass the entire month of August, now in some cases it is only two weeks, forcing the workers to take the remaining vacation at other times.

In August, when production is halted, production lines are overhauled, shops are rebuilt and factories are retooled. I wonder which new car models FIAT is getting ready for this year!

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** DER MANN VON DRÜBEN **

*** by Joachim Schürmann, HB9/KA9WGP ***

All my recent trips and the persistent use of public transportation have shown me what I need. And what my travel bureau needs too. We need...

The multidimensional isotemporal traveler's map

No, it does not have anything to do with time travel and it is a real life item - which doesn't exist (I think!), but should.

Have you ever seen the weather maps that are published in news papers and specialized literature? The weather maps have often roughly concentric lines to show a high or low pressure area. These lines are called the isobars, or lines with identical pressure. To obtain these maps weather men record all pressure measurements performed in a given area on a geographical map, and then connect all identical measurements with a continuous line. This is the isobar. The presence of the isobar will not truly add anything to the information obtained, but it will provide a synthesis of the situation in a fashion which is readily acceptable even to the untrained eye.

The simplest form of my isotemporal map will have some of the characteristics described above. However, the measurements recorded on the map are not weather related but are the relative travel times to the various spots on the map, in relation to one particular spot on the map itself.

In order not to bore you with an example from Italy, I will try to explain the concept using Chicago. Let's say Chicago is at the center of the isotemporal travel map. Now, the travel distance from Chicago to Milwaukee is approximately 1½ hours. It will also be about 1½ hours to get from downtown Chicago to St. Charles, Illinois. Milwaukee and St. Charles, Illinois will lie on the same isotemporal line. And so on, taking available streets and other means of transportation into account.

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One can, of course, limit the isotemporal travel map to one particular type of transportation, for example, ground transportation. If, however, we want to present a complete picture, all means of transportation could be included. If we had an isotemporal travel map centered on Chicago O'Hare Airport, Chicago downtown and New York La Guardia would probably be isotemporal points. In fact, we would probably have isotemporal pockets over the major cities served by O'Hare with roughly concentric isotemporal lines for longer travel times around these pockets.

On a map of this complexity, colour coding might help. For example, the area containing isotemporal points for a travel time included between zero minutes and 60 minutes could be coded bright red. The next isotemporal zone would be pinkish. And so on, down to blue and white. On a map like this, again centered on O'Hare, certain Chicagoland areas would have the same colour of Manhattan. Frankfurt (FRG) might have the same colour of the Indiana countryside.

I also see a variation of this particular map. I would be able to draw some sort of example and approximation of the map described above, but the graphical representation I am going to explain now, I would have trouble to draw. I can describe it and bring examples of the principles behind it, by I could not show concrete proof of its feasibility.

This second, and more sophisticated way of preparing an isotemporal map would be an isotemporal projection. In the mercator projection the correct angle and distance is shown for any given geographical point in relation to the map center. In the isotemporal projection the correct angle and travel time would be shown for any geographical point in relation to the map center. In this case the towns in Chicagoland and La Guardia airport would not simply be in an area bearing the same colour code, but they would be placed at the same apparent distance from O'Hare. This would somewhat revolutionize their geographical arrangement, but would allow for very precise gauging of the travel time and direction.

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*****
***  August 1988          page 06 of 06  ***
***                               ***
**                DER MANN VON DRÜBEN                **
***                               ***
***  by Joachim Schürmann, HB9/KA9WGP  ***
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Now if we postulate a two dimensional map instead of a three dimensional map, things can get even more interesting. We could have a standard geographical map with dips and peaks which represent the relative travel time. Or, as an adjunct to the isotemporal maps discussed above, added dimensions could represent the type of carrier, the situation at a given point in time (depending on rush hours or carrier time), or the cost of transportation in dependence of other travel variables.

The ideal representation of these additional dimensions seems to be possible only via computer terminal, but one can also envision a three dimensional model that encompasses some of the variables listed above.

I can see many uses for a map like I just described. The simple ones, possibly as a bidimensional isotemporal projection, for us common travelers. Computer generated multi-dimensional models for travel agencies, possibly continuously updated depending on prevailing travel pattern, cost changes and seat availability. More sophisticated models for military use, who would take into account phenomena like weather patterns and enemy action.

Science fiction? I don't know. Seems to me we should have maps like these. And if we don't have them I don't know why not. Anybody like to comment?

Postscript

Did you notice? Look at the header! Finally I have the right printer with all the little extra letters I like to use. It's an EPSON EX-1000 from the office. Hevnt't found anything yet that cannot be printed. Here's a sample:

Ü ö ŷ ù û ò ö ø £ ¢ Æ æ é Å Ä î î ï è ë ê ç ä à ä å é è ï

And on this point, ahem.. umlaut, I shall close.

FIND MYSELF A CITY TO LIVE IN

("Heard about Houston? Heard about Detroit?
Heard about Pittsburgh, PA?")

Gregory Ruffa
coming soon to
1004 7th St., S.E., #103,
Minneapolis, Minn. 55414

Well, I'm committed **now...** The room where I'm typing this gets completely disconnected in about a week-and-a-half and the movers will be here by the 30th. I spent a week in Minneapolis looking the place over and picking out a place to live before everyone else shows up. I don't know when I'll be moving in exactly, since the apartment is being recarpeted after the current tenants leave and the movers can't estimate a delivery date to better than five days' precision until they come to pick me up. Somewhere in there, I'm supposed to go to my other sister's wedding on the 10th (there's a non-zero probability that I won't make it...). So I don't really know exactly when I'm flying out of San Diego or when I'll start living in Minnesota. The former date is somewhere from September 1st to 9th and the latter is somewhere between the 2nd and the 13th. Anyway, mail should be accepted at the mailbox associated with the above address with the start of the new month.

I will be starting in on graduate school again on September 22nd. I managed to spend a couple hours with the head of the Astronomy Department and another half-hour with the chairman for graduate studies, both of whom were theoretically out-of-town during the last week of July. I will be taking lots of physics and some astronomy until next year, so that I can get through the qualifying exam when I take it around the end of '89. I could be getting involved with research by next spring, which would start getting me a little money back in again. I hope to be finished in about four years...

* * *

That explains where I was at the end of July. In the middle of July, I was away for another week, spending it in France (Cannes, no less) on business. That's pretty much all there is to say about that. It's a good sixteen hours by air from here, stopping to change planes in Chicago and Paris. Right after we arrived in Nice, we had time to find the hotel, unpack, clean up a bit, and go straight to the Aerospatiale offices, where I had to spend a couple of hours explaining a technical report I'd compiled. (Aerospatiale is a large French aerospace concern which manufactures, among many things, the satellite we are going to launch for Eutelsat, a telecommunications consortium. This particular branch in Cannes is right along the beach boulevard: one wonders how the people on the south side of the building get any work done. They had us to lunch twice while we were there and drew admiration from my fellow travellers for being the only aerospace company we'd ever worked with that has its own wine cellar, with bottles sporting the corporate emblem.) We gave a presentation on all the details of the launch, set for March of 1990, which went straight through two days. The next day was Bastille Day, so almost everything was closed, except the cafes and restaurants, so I amused myself with reading and long walks. The fireworks display was spectacular and loud and just a half-hour long; I managed quite by chance to find a viewpoint almost directly behind the pyrotechnic barges. The next morning, we packed up and started for home -- it was a **very** long Friday. (I didn't miss much by not getting to shop out there. With the current exchange rates, everything costs about the same as it does here; in fact, at discount clubs here, some items such as perfume are **cheaper**. The exception was dining: \$15 for breakfast and \$30 for lunch and dinner was typical. I'm sure glad I was on expenses...)

My boss has avoided mentioning that I'm leaving about as much as it is possible to do so. I only found out a couple days ago who is taking over my mission for me, so I have all of four days to familiarize them with what I've been doing since February, along with completing a couple other little jobs by the 26th. I'll be collecting a bunch of overtime these last couple weeks, anyway. I guess I'll miss some of the people I know here, but, with the pace I'll been on since September, grad school is going to look like a vacation!

So that's why no one's been able to get ahold of me by phone and why the APA didn't come out in July (well, **part** of the reason). I also apologize for the **weight** of the last issue. My favorite copy shop did it again. I **handed** them the pages and said: "See, these pages go back-to-back and these other ones are single-sided. Print them just that way." So the clerk marked down "B/B AS IS" and "S/S" and took the job. And the night operator read the last three words and printed everything single-sided... So this time, I gave them **only** the back-to-back stuff and ran off the rest at work. Evidently, they **can** deal with **simple** instructions.

* * *

Space Systems and my department, Trajectory and Performance, are getting busier and busier as Commercial Launch Services continues to race about hunting up new business and the work from accepted proposals starts to flood in. We are presently working on AC-68/FLTSATCOM (the mission where we slipped up and "popped" the Centaur last year), Eutelsat-II, GOES, and CRRES. The launches will be in August '89, March '90, June '90, and early '91. We also have the Italian X-ray astronomy satellite, SAX, but you didn't hear that from me -- it'll be officially announced **next** year. The Hughes proposal for UHF, the next generation of Naval communications satellites, was accepted, for which we are primary launcher. GOES is a series of three spacecraft and UHF could be as many as ten.

That's just what's going on with Atlas-I. The Medium Launch Vehicle-II contract that we won in May is now officially known as Atlas-II. (That's what was on the hats they were giving away when they re-dedicated the rocket factory last month.) Atlas-II itself is supposed to be a military vehicle for launching the DSCS-III series, of which there are several satellites. However, I'm currently evaluating its performance for use on prospective Eutelsat flights, which could number two or three; if it does what they want, the Europeans are "ready to sign." The Atlas-II is also being modified as a slightly more powerful commercial vehicle, the -IIA, which we are out hawking right now. There is also a -IIAS version, which uses "strap-on" solid rockets, and a -IIASX, with **bigger** solid boosters, under consideration. Somewhere around the twelfth Atlas (give or take a couple), we will stop making Ones and switch to Twos only. I've also started hearing references again to "Atlas-III", but it's not clear yet what anybody means by that...

As if this weren't enough, Medium Launch Vehicle-I has returned. This was a contract to launch the GPS satellites, which was won last year by McDonnell Douglas for their planned Delta-II rocket. A couple things went wrong. Their plan was to launch out of Florida on a northeastern trajectory to reach the 63° inclined orbit that GPS uses. However, the path takes them over central Europe and the Middle East before they can get to an orbital condition. Since 1986, the range safety officers at Cape Canaveral have gotten very hard-nosed about impact traces that pass over land, particularly if it's inhabited. Atlas has more than enough energy to reach the orbit with an acceptable east-southeasterly flight and a plane change, which Delta can't hope to do. The other difficulty: remember that "rocket fuel" plant that blew up in Henderson, Utah a while back? They made about half the country's supply of oxidizer for solid rocket motors. Guess what Delta uses that we don't? Since the Space Shuttle and Titan have priority on what solid propellant will be available for the next couple years, we could be picking up some unexpected work.

(Pardon me a moment. The Blue Angels are buzzing my house. The Miramar Air Show is going on this weekend. When one lives less than two miles from a naval air station, one must expect these things.)

I guess our proposal was bad enough, to quote one of the Crystal Palace folks, because we won one of the ALS Phase II contracts. We now have about two years to figure out how to make the cute line drawing into something that can actually be built and flown. This is followed by proposals for Phase III, which will be full-scale development. Essentially, the Advanced Launch System is supposed to be a series of Saturn IB to Saturn V class rockets, but cheaper. The fantasy is to bring the cost of transportation to low Earth orbit down to about \$1000/lb by 2000 and to \$300/lb by, maybe, 2010. This is to be accomplished by almost totally automated fabrication and a launch rate of about one a week. Haven't we heard this before, say, about the Shuttle back in 1973? Even the Air Force is now expressing doubts about ever reaching that cost goal. The only group that can possibly use 100,000 to 150,000 pounds delivered every week is SDIO. If SDI is scaled-down, changed into a largely ground-based system, or is never deployed at all, the rest of the Defense Department and NASA don't have enough payloads to keep ALS busy at that level (we're talking about a rate that could put the entire world's space programs to date into orbit in perhaps two years). I was talking about this with someone at work and was moved to point out that NASA (and probably DoD) can't get the budget to run projects that would require payloads that could use ALS to advantage. It begins to look to me like this could turn into another aerospace-welfare program that will never attain its objectives and create another boom-and-bust among the engineers in the industry. ("What's your view? We'd like to know.")

* * *

MAILING COMMENTS

APA-TECH 59

GTB-III You goofball!!! Ya left Barry's name off the roster. And when're ya gonna get the accounting from Donna, so you can tell people how much is left in their accounts? And why dintcha just retype those two pages, instead of submitting that mess that way?! What's that? Oh -- that's me... Well, I should have everyone's accounts updated for the next issue. Uh... sorry.

Joa You're making me want to take up shortwave listening again. I got a Norelco multi-band short- and long-wave receiver as a gift during my senior year in high school and used to hunt around for interesting stations, halves of ham conversations, and so forth. About three years later, the contacts for the push-button band switches failed. The radio spent about a year in a couple of shops waiting for a part, until they finally learned that Norelco was no longer distributing in America or servicing units there. I've been noticing lately the compact multi-band receivers the Japanese offer here, but haven't followed through on the desire (partly because I haven't been sitting still long enough to listen to radios these days).

Thank you for returning to the subject of tea. I haven't drunk much of it for some time, since it's rarely cool enough here for hot tea to be welcome. I imagine I'll be picking up the habit again **this** winter...

This issue has hung around so long that your next 'zine arrived in time for inclusion. Oh, well.

Susannah The January issue turned up in some things Donna sent me, so I felt it should get published anyhow. Sorry about the delay...

So Dave's gone back to school, eh? Good luck to him. Say, how many people in this APA are actually, you know, **working** for a living? Hands?

I believe I recognize that particular rubber-stamped comet. What sorts of images do **you** collect? As you can tell from a couple of the APA covers, I like space-related and SF-type stuff, as well as certain popular-culture items and some plain screwball stuff. Do you know about **Rubberstampmadness** or any of the other stamper rags? The best shop I've found so far is Iconography in Rice Village, near Rice University, in Houston.

There are APAs like SWAPA which, I understand, do have a fully-rotating editorship which passes among **all** the members. My impression is that this tends to hang up, anyway, if somebody's turn falls during a bad month for them and that accounting (and accountability) can turn into a nightmare. The problem we'd have had here is that we **have** had and still have international members, which would make compiling certain issues **very** expensive (#59 cost about \$6 to send to Japan and Switzerland). I think we can manage with one or two editors all right, as long as they don't get clobbered with obligations. If we **do** go back to monthly publication (which I feel would require at least ten regularly **contributing** members), I certainly would want to see at least two editors on this APA. Editors **should** live in large cities, where copy shops offer 3½¢ or less on larger print runs. (*psst* If you or anyone else here **really** wants to help edit something, **Pyro** would be happy to have you!)

It is my observation that a typical reading person, like everyone in this crew, for instance, has collected by about age 25 more books than he or she will live to read (which **never** stops them from buying more books or visiting libraries). **This** is a habit (though maybe not a healthy one?). When that person has to start piling packed boxes of books on their balcony or rents warehouse space, maybe **then** it's a vice.

Audrey and Gabe I hope things are going well for you, breaking in "NORAD."

My father used to go to estate and salvage auctions a while back. This is a very dangerous habit to form. One gets caught in the deadly "Saving Money" trap. Our basement still contains many of the "wonderful" things he "saved money on."

Your discussion suggests that basic biological behaviors (the so-called "instincts") for both genders already exist together in the brain and that biochemical balance in the individual (of hormones, for example) inhibits certain of these behaviors, allowing others to be expressed. Is there anything to this idea? Is it discredited?

Valli I imagine my life will seem calmer for a while. Lack of income, voluntary or otherwise, has a certain settling effect on some. Actually, I will still be travelling to AIAA functions for some time and I may hit a con or two a year, in addition to the occasional astronomical meeting.

As I indicated to Susannah, the only problems with having Joa edit is the cost and the fact that the mail takes a week each way...

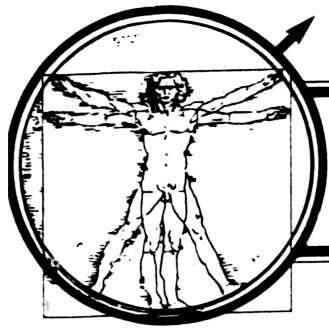
This was definitely an issue for January revivals. As always, thank you for the travelogues.

Annette Shame on you, writing APAzines when you have all those fiber bundles and homomorphisms piling up unattended...

I'm beginning to feel that while college does **not** prepare one for graduate school, a stint in industry might. I'm not dissuaded from going back **yet**, at any rate.

Rolf put me on to Smullyan some time back with, I think, **What is the Name of This Book?** After NASFiC last year, we hit a bookstore in Tempe, Arizona, where I picked up **Alice in Puzzleland**, **The Lady or the Tiger?**, **To Mock a Mockingbird**, and **Forever Undecided**. I haven't gotten to them yet: the last two are about as casual a read as, say, **GEB**. I also have the Lem books you discuss. Your review puts me in mind of **The Pooh Perplex**, which Dr. Guy loaned me years ago. The author discusses Winnie-the-Pooh from various literary, historical, and political stances. It's riotous if you've ever suffered through philosophy courses...

*** More later. Can't make Worldcon. See you around. Hear from you in October?



Mars Underground News

VOLUME II, NUMBER 1

SPRING 1988

FLETCHER CALLS MOON BEST FIRST STEP

NASA Administrator James C. Fletcher, speaking in April before the National Space Symposium in Colorado Springs, remarked that the Moon, rather than Mars, may be the best initial destination for possible US/USSR piloted missions. "Going to the Moon together would give the two leading spacefaring nations in the world an opportunity to build a stable base for further cooperation, which could one day lead to a cooperative mission to Mars," he observed.

Dr. Fletcher stressed that any cooperative human mission should be preceded by a program of cooperative robotic activities. "Flying out to Mars together before building such a foundation could, for several reasons, be less practical."

In the past few years, many newspapers, individuals and organizations, including The Planetary Society, have advocated a piloted US/USSR mission to Mars. Dr. Fletcher cited what he feels are three crucial factors favoring the Moon for the first cooperative crewed mission:

1. Timing--A joint mission to the Moon would involve a relatively short timetable, while a Mars mission "would probably encompass four or five presidential administrations," Dr. Fletcher said. He noted that relations between the United States and the Soviet Union have yet to demonstrate the stability required for such an undertaking.

2. Cooperative experience--A year ago the United States and the Soviet Union signed a space science agreement establishing joint working groups in five areas. The efforts of these groups "could lay the groundwork for a strong bridge of mutual cooperation and mutual trust," Dr. Fletcher said.

3. Technical readiness--Both nations realize there are "many technical unknowns involved in a manned Mars mission," Dr. Fletcher commented. These issues, such as the effects of prolonged weightlessness on the human body, must be considered before commitments can be made for a Mars mission.

For a copy of Dr. Fletcher's speech, call the NASA Newsroom, (202) 453-8400.

ROMANENKO RESULTS

Can humans stand a zero-G trip to Mars? On December 27, 1987, Soviet cosmonaut Yuri Romanenko established an Earth-orbit endurance record of 327 days (11 months) aboard the *Mir* space station. According to preliminary reports from the Soviet Union, Romanenko's physiological adaptation to microgravity required less time and resulted in smaller losses in bone strength and mineral content than doctors have observed with previous flights. According to Anders Hansson from the Institute for Space Biomedicine in Sheffield, England, Romanenko reported a 5% loss in bone calcium, which levelled off after 80-110 days of flight. Muscle atrophy was more extensive, with 10% loss of volume, but only 1% loss of muscle fiber.

Romanenko's success, as reported in the December 29, 1987 issue of the *New York Times*, may be attributed to a rigorous work schedule, two hours of exercise on a stationary bicycle and treadmill, and the "penguin" suits designed with elastic bands to provide resistance to movement for additional muscular conditioning. According to a report by Keller and Strauss presented at the 1988 Lunar Base Conference in Houston, there is a close correlation between skeletal adaptation and activity. While Romanenko's regimen was adequate, the researchers concluded that more rigorous activity such as weight training or sprinting may be a more effective countermeasure than more sedentary and less intense activities like bicycling or running.—Kelly McMillen

ADVANCE ON ROBBINS REPORT

In September 1986, the NASA Advisory Council convened a committee of 17 prominent scientists and physicians to complete a comprehensive review of NASA's life sciences program, recommend goals and develop scientific and technical strategies for achieving those goals. Under the chairmanship of Nobel laureate Frederick C. Robbins, the Life Sciences Strategic Planning

Study Committee met periodically for over a year, visiting field centers, meeting with international representatives, surveying professional organizations and groups active in medicine and biology, and reviewing the issues relevant to the future of basic science, space exploration and, particularly, extended human space flight.

Their findings and recommendations will be available in a report, "Exploring the Living Universe: A Strategy for Space Life Sciences," scheduled for release in mid-June. This report takes a bold approach to near-term requirements for biomedical research, gravitational biology, biospherics and exobiology. It also studies the factors that could possibly limit human space flight, including physiological deconditioning, radiation exposure, psychological difficulties and environmental requirements. This logical follow-up to the Paine and the Ride reports will be available from NASA by calling (202) 453-1530.—Paula Korn

REAGAN BOOSTS HUMAN EXPLORATION

Speaking before the annual meeting of the Electronic Industries Association in Washington, DC, President Reagan underscored his interest in the health of the US civilian space program, including human exploration beyond the confines of Earth. "I look to the time, before the end of the first decade of the next century, when we may have manned visits to other planets," he stated. In his dinner address Reagan supported the National Aerospace Plane (NASP) as "an important investment in our future," noting that the plane will be capable of taking off from Dulles Airport, leaping into space and docking with a space station—similar to taking off from Washington, DC and heading for London. "Not only the Moon, but the entire solar system beckons, which is why I have issued a new national space policy that reaffirms the goal of US leadership in space and sets a new goal of expanding human exploration into the solar system," Reagan commented.

The President also remarked that he has asked for \$100 million for the initiation of Project Pathfinder, noting that the program will "lay the foundation for potential manned and unmanned missions beyond the Earth's orbit." "Tonight I ask Congress and all the American people to join me in making the long-term investment required to advance US leadership in space. We must begin that investment by funding the increas-

es I've proposed for our civil space program. Can we afford to stop our exploration and wait for others to pass us?" the President asked.—Leonard David

NATIONAL MARS COMMISSION PROPOSED

A proposal for a National Mars Commission, introduced by Representative Robert G. Torricelli (D-NJ), has made it into the House Science and Technology Committee's fiscal year 1989 authorization bill for NASA. Senator Tom Harkin (D-IA) has submitted a similar bill to the Senate. Whether or not the commission will be included in the final congressional authorization bill depends on Senate action on this provision.

The House Authorization Committee's bill also includes support for the human exploration of Mars as a new NASA project to begin in 1992. Special emphasis is given to cooperation with the Soviet Union.

TOO EARLY FOR JOINT PILOTED MISSIONS?

In a November 18, 1987 letter to President Reagan, Representatives Manuel Lujan, Jr. and Robert Roe, asked that the White House explore with the Soviet Union "the possibility of a joint American-Soviet manned mission to Mars." The representatives, both top members of the US House Committee on Science, Space and Technology, called the mission a "venture that could have more lasting beneficial results in terms of international good-will and technological progress."

The White House response came from J. Edward Fox, Assistant Secretary for Legislative Affairs at the Department of State: "At the present time, the Department believes it would be premature to commit the United States to join with the Soviet Union in such a major space project. The United

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Editor: Tom Meyer

Technical Advisor: Christopher McKay

Publisher: Charlene Anderson

Contributors: Penelope Boston, Leonard
David, Paula Korn, Kelly McMillen.

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For information about The Planetary Society, write: The Planetary Society, 65 N. Catalina Avenue, Pasadena, CA 91106.

States has not yet committed itself to Mars missions beyond the *Mars Observer*, much less to its own manned mission to Mars, and the current budget situation makes such a commitment difficult at best." The State Department reply also noted that as space cooperation with the Soviets improves, so too will US confidence in more ambitious cooperative projects.—Leonard David

MEETING REPORTS

CASE FOR MARS III RESULTS: LIFE SUPPORT

The critical issue of life support for human Mars missions is being addressed on several important fronts. NASA and associated contractors are continuing to develop the CELSS (closed ecological support system) Breadboard project at Kennedy Space Center with supporting research from Johnson and Ames Research Centers.

The Biospheres II venture, a privately funded, university-supported research facility in Arizona, has recently put eight people into the closed-system environment for a two-year trial period. Further research is taking place aboard the *Mir* space station, though comprehensive reports are not yet available.

At the Case for Mars III, held in Boulder, Colorado last July, new ideas presented in the life-support session included University of California architect Alice Eichold's proposal that, rather than build the space station from the "outside in," the design should be directed toward integrating the need for recreation into the context of routine duty. Eichold's innovative ideas balance the dual ideas of the CELSS program: use of space for the psychological and physical well-being of crew members and conservation of space from an engineering point of view.

Tyler Volk of New York University examined the consequences of not requiring all wastes from life support to be recycled back to the food plants, concluding that cellulose production on Mars could be an important input for many non-metabolic requirements. The fluxes of carbon in cellulose production would probably exceed those in food production so that settlements on Mars could use "cellulose farms" to make materials for structures and perhaps furnishings for a Mars base or colony.

In the biomedical session, George Swanson of the University of Colorado offered an

approach to fitness management. Swanson redefined the parameters of cardio-respiratory fitness by characterizing blood lactate response. His model suggests that the index of fitness should be oxygen consumption when the rate of change of lactate just exceeds the rate of oxygen consumption. Previously fitness was defined according to the "threshold" model.

Additional talks provided insight into the problems of bone loss (M. Cohen), space suit design (J. Billingham), and radiation biology (B. Clark). Dr. Billingham suggested that the space suit be inflated to cover extremities and to constrict vascular blood flow, an idea similar to the "penguin suit" designed by the Soviets for use aboard the *Mir* station.—Penny Boston and Kelly McMillen

FUTURE MEETINGS

EXO BIOLOGY IN SOLAR SYSTEM EXPLORATION—A symposium on Exobiology in Solar System Exploration will be held August 24-26, 1988 at or near NASA's Ames Research Center, Moffett Field, CA. Topics will include planets, comets, asteroids and other celestial bodies; current knowledge of Mars and exobiology; and planned and future NASA activities. Speakers will also address the status of the *Mars Observer* mission and the US Mars rover-sample return project.

For more information, write to Judith Huntington or Deborah Schwartz, NASA's Ames Research Center, Mail Stop 239-12, Moffett Field, CA 94035, or call (415) 694-4204.

DUST ON MARS III—A call for abstracts has been issued for the MECA-LPI Workshop entitled "Dust on Mars III," to be held September 21-23, 1988 at Estes Park, CO. The goal of the workshop is to stimulate cooperative research on and discussion of dust-related processes on Mars. This should provide valuable background information and help in preparation and scientific planning for the *Mars Observer* mission. The workshop will address the following general questions:

1. How is dust ejected from the martian surface into the atmosphere?
2. How does the global atmospheric circulation affect the redistribution of dust on Mars?
3. Are there sources and sinks of dust on Mars? If so, where are they, and how do they vary with time?
4. How many components of dust are there

on Mars, and what are their properties?

The deadline for abstracts is July 15, 1988. If you have any questions, please contact the LPI Projects Office at (713) 486-2158, or call the conference organizer, Steve Lee, at (303) 492-5348.

FOURTH INTERNATIONAL CONFERENCE ON MARS—Although the last *Viking* landed on Mars over a decade ago, recent studies have addressed several still-unanswered questions. A new generation of spacecraft explorations is planned, beginning with the Soviet mission to Phobos to be launched this year. The *Mars Observer* is scheduled for launch in 1992, and a series of further Soviet and American missions under consideration. This seems like a good time to review what is known about Mars and to study the many intriguing questions. To this end, a Fourth International Conference on Mars is planned for January 10-13, 1989 in Tucson.

The conference planners' objectives are to summarize what is well known at the beginning of the new era of spacecraft exploration and to focus discussion on areas of uncertainty. The intended theme of the conference is to summarize those aspects that are known with reasonable confidence, to identify the key points at which interpretations diverge, to discuss the implications of alternate interpretations and to identify key future measurements.

An important outcome of the conference will be the production of a book about Mars to be published by the University of Ari-

zona Press as part of its space science series. For more information, contact Hugh Keiffer, United States Geological Survey, 2255 N. Gemini Drive, Flagstaff, AZ 86001.

RESEARCH BRIEF

Bruce Jakosky, a research associate with the Laboratory for Atmospheric and Space Physics at the University of Colorado at Boulder, is studying Mars' water cycle to learn more about climatic trends on Earth. Jakosky was recently selected to help coordinate the study of the Red Planet by the 1992 *Mars Observer* mission.

According to Jakosky, the cyclical system on Mars is remarkably similar to ours, providing an excellent model for hypothesizing about Earth's ice ages and future climatic changes. He thinks that the vast valleys and channels scarring the martian surface may be erosional features caused by the planet's periodic tilting to and away from the Sun. As Mars tilts toward the Sun every few hundred thousand years, its polar ice caps warm and cause water vapor to be distributed over much of the planet. "The snow and ice build-up, which may be as deep as 10 to 15 meters during high tilt, melts from underneath, similar to a greenhouse effect in which the Sun's rays are absorbed but heat is not emitted," Jakosky explains. "It's this run-off from underneath that may cause erosion and form the channels we now see on the surface."—Leonard David

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What we don't know can create problems, but even greater problems can arise from what we think we know, but which is inaccurate.

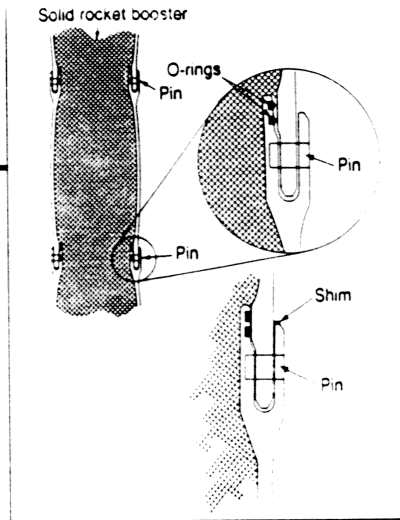
The Rogers Commission investigating the Challenger incident seems to have set out to create a body of facts that are not true. This is my conclusion after reading Richard Feynman's dying declaration in the February 1988 *Physics Today*. (Feynman died almost simultaneously with the *PT* publication.)

The Commission was an almost typical Washington commission. Its head was William Rogers, just about the consummate example of a Washington insider. (Caspar Weinberger, retiring as Secretary of Defense, has joined Rogers' law firm several rungs down the ladder from Rogers. Perhaps only Clark Clifford can come close to Rogers in the class of political lawyers.)

Who made up the Commission? In the words of Senator Hollings, "So who have ya got, there, on your commission? Ya got a couple of astronauts, a Nobel prizewinner, a general, some businessman and a couple of lawyers. What you really need is gumshoes, who will be right down there at Kennedy, eating lunch with the very guys who do the work on the Shuttle."

Rogers actually had a gumshoe, whom he could not suppress. Feynman reports that Rogers did his best to keep the Commission from finding any disturbing facts, tried to sit on Feynman, and then tried to freeze him out. It didn't work. Feynman had a bone and he wouldn't let go. Feynman eventually issued his own report, differing substantially with the preconceived notions of the Commission. And probably killed any chances for future independent thinkers to appear on Presidential Commissions.

I feel sure that Mr. Rogers would have been much more comfortable with Henry Hudson, of the Meese Por-



*New analysis indicates
other causes for*

The Challenger Disaster

by Dr. Yale Jay Lubkin

nography Commission, who replied to criticism that that commission had reached unscientific conclusions: "If we relied exclusively on scientific data for every one of our findings, I'm afraid all of our work would be inconclusive."

Or with OSHA, who, right after Challenger, gave NASA a citation for having the best government workplace safety record.

There seems to be much to hide. Feynman lights up a lot of bureaucratic garbage at NASA. CYA is running rampant.

Questions. The Challenger incident leads one to ask many questions. Since one can draw any conclusion from a false premise, the first question is "Just what happened?" This is hardly trivial, but the experiences of Feynman and AbuTaha lead to a second question: "Why are the authorities trying so hard to prevent the answer to the first question?" The third question is "Why did it happen." The answer to the fourth question is self-evident. "If NASA is fixing the wrong problem, what happens next time?"

Let me introduce Feynman and Abu-

Taha. Richard Feynman was a Nobel Laureate in Physics. More importantly, he was a great physicist with an informal manner and a driving curiosity. Alone of the members of the Rogers Commission, he had the intelligence and the drive to find out answers, was beholden to none and was afraid of none. He viewed his job as only to find out the truth.

Read his dissenting report and read his article in *Physics Today*. Read between the lines as to the purpose of the Rogers Commission, and remember what William Rogers is. (Also read the extensive article by Trudy Bell and Karl Esch in the *IEEE Spectrum* of February 1987.)

Ali AbuTaha is a space engineer, with ten years' experience at Comsat, plus another few there as a consultant. He has been a space consultant for some time. He read the Challenger Commission report simply for self-education, but his curiosity was excited when he found a large number of "specific disparities, errors and mistakes." And a few outright lies. He dug into it at his own expense, and spent almost two years of time and thousands of dollars. He got a second, third and fourth mortgage. He hunted up reports and video tapes from non-NASA observers and processed them, and formed a theory. He transmitted this to NASA. They first dismissed him out of hand as a kook for daring to question the official dogma, then tried to destroy his reputation by *ad hominem* attacks, then appropriated some of his findings and passed them off as their own.

You can understand some of what happened by reference to Figure 1, from Feynman's article. The figure shows the joint between 12-foot diameter sections of the booster. The upper section has a lip that fits into a clevis in the lower section. The leak of hot gases quite clearly came from that section of the joint between the bottom and middle sections of the booster which was next to the main rocket. (The O-rings are on the inside.) NASA and the Rogers Com-

mission say that the O-rings lost resiliency because of the cold and allowed a 20 mil leak, starting 0.67 seconds into the flight, mysteriously closing at 3.52 seconds, then disastrously re-opening at 58.8 seconds.

Feynman says that this isn't true. Morton Thiokol goofed on the design, and knew it. The internal pressure of the rocket was supposed to squash the O-ring into a good seal. Problem was that the joint was much stronger than the rocket wall (it was three times as thick), so instead of the joint deforming, the wall deformed, lifting the O-ring away from the joint, and allowing the leak. So Feynman's theory calls for a continuous leak.

The Thiokol engineers knew the joint was no good, and tried a bunch of fixes. They went to Parker Seal Company, who made the O-rings, for advice. Parker said that O-rings weren't supposed to be used that way, and had no advice to give.

One makeshift that Thiokol used was to shim the outer portion of the joint, as shown in Figure 1. Unfortunately, the outer lip is much lighter than the middle, so that instead of squashing the O-ring, the shim just bent the outer lip outwards.

Ali AbuTaha has the most convincing

theory. The lower section of the booster had been used in a previous flight. There is a strut connecting the booster to the external tank, and this strut is located just below the joint. There are tremendous forces on this strut, on the order of a million pounds, and the strut pulls on the side of the booster. The forces of the previous flight bent the bottom section out of round, by 0.512 inches according to measurements (apparently by Lockheed personnel) at the Kennedy Space Center.

This meant that the midsection would not fit into the lower section. The midsection was apparently round. As far as AbuTaha can tell, the Lockheed people used a hydraulic press and adjusting nuts mounted inside the middle section to squeeze the middle section together to distort the shape so that it matched the out-of-round bottom section. This seems to have caused a crack at the edge of the middle section, which then leaked continuously during the flight. Flames are clearly visible on enhanced videos during most of the flight. AbuTaha provided 39 enhanced photos of the leak, flame, etc. to NASA on August 12, 1987.

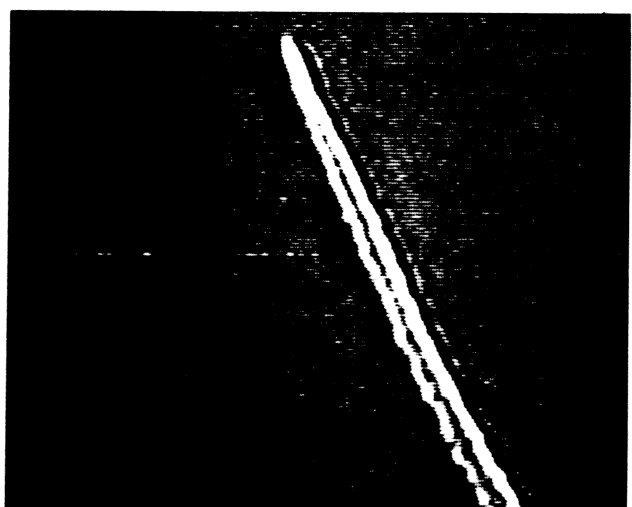
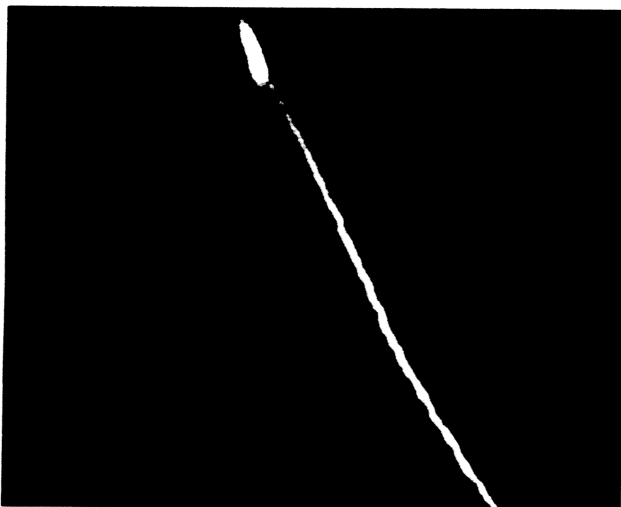
Instructions were to limit the hydraulic pressure to 1250 lb, which was done, but there were no instructions as to how much pressure should be

exerted by the adjusting nuts. Nobody ever measured.

The leak caused a side thrust, diverting the Challenger from the proper course. The Challenger control system put a correction in the loop, to cancel the side thrust. This caused the whole system to hunt, as can be seen from the time sequence of position shown in Figure 2. The Challenger oscillated. Each oscillation put tremendous stress on the strut, on the order of millions of pounds. The oscillations are clear from the shape of the exhaust plumes.

The strut and the control system oscillation flexed the booster wall in and out, each time causing the release of hot gas. Eventually, the continued violent flexing caused the entire strut support structure to break off, letting the flame hit the Challenger directly, killing some of the crew and then causing the explosion. (Some of the crew were apparently alive at the moment of impact.)

It was not the leak that killed the astronauts. It was the attempt to correct the sidethrust, which sent the Challenger into violent oscillations. If the Challenger had been permitted to go off course, without attempting the major correction, the side of the booster would not have broken out, the booster would have burnt out



with the Challenger still intact, and the crew could have ejected, off course but alive.

AbuTaha has thousands of pages of documentation and many photographs and video tapes to prove his contentions. We have room to show only one photograph, taken from a video made at New Smyrna Beach by Harold Sehnert of Ohio. The photograph, Figure 3, is fifty or sixty seconds into the flight. Note that the intermittent nature of the puffs is clearly visible. Many stills can be seen in the March 1987 issue of the British magazine *Spaceflight News*.

Note that one similar shot was used by the Commission in its report, but it has been cropped to exclude the puffs. The twin plumes were presented as coming from the two boosters, rather than from the boosters and the leak, as is obvious from the film. One unversed in the subtleties of Washingtonspeak might call this a deliberate lie.

The NASA Reaction. In bureaucracy, the NASA reaction was pure CYA. A Supreme Court justice said it is not only necessary to do justice, it is also necessary to give the appearance of doing justice. NASA does not seem to be doing either.

For example, Malcolm McConnell, in his book *Challenger*, (Doubleday, 1987) just about accuses two NASA bigwigs of severe conflicts of interest. He accuses Dr. James Fletcher, periodic NASA Administrator, of being a member of a Mormon Mafia who threw the booster contract to Utah-based Thiokol, despite their inferior product and lack of experience. He also blasts Dale Myers, who alternated between being Deputy Administrator of NASA and a high Rockwell executive, for pushing the Challenger award to Rockwell in still-secret proceedings.

Now McConnell exhibits a left-wing, anti-Republican bias, but he does raise valid questions and does appear to have been stonewalled by

the NASA legal eagles. He notes that Aerojet was able to make one-piece boosters, and thus avoid an entire set of problems due to Thiokol's need to use multiple segmented rockets. He notes that the McDonnell-Douglas orbiter proposal included an abort motor which would have separated the orbiter from the stack, allowing it to glide back to the landing site in the event of booster failure.

But AbuTaha was not engaged in politics. He was engaged in engineering. And NASA trashed him, then stole his ideas.

In July 1986, for example, AbuTaha reported finding that Challenger was operating with negative safety margins for loads at lift off, backed it up with analyses and sent the data to NASA. His findings were rejected with comments like, "It is unnecessary to pursue the thoughts contained in your report," (John Thomas, Oct. 30, 1986), and, "The loads and stresses measured prior to and during launch match those predicted within nominal tolerance," (Richard Truly, Nov 12, 1986).

In a memo to Fletcher on January 15, 1987, the National Research Council was talking about negative safety margins. But in March 1987, AbuTaha was still receiving comments from NASA of "not plausible" and "NASA finds no new evidence in any of your analyses that could change the original sequence of events or the cause of the accident," (James Rose, 13 March 1987) while NASA was presenting AbuTaha's findings as their own.

It is also not especially clear how cold weather could have caused four O-rings to be damaged on launch 51-B, including almost complete burnthrough of the primary O-ring on the left booster nozzle joint. The launch temperature for that launch was a balmy 75°F.

It is not especially clear how the NASA and Thiokol executives attained their perspectives on the mis-

sion. Feynman questioned many people about their estimate of probability of mission failure. Working engineers typically estimated about one in a hundred. Executives estimated about one in a hundred thousand; i.e., one failure could be expected in a sequence of one launch a day for three hundred years. Do executives get a daily fix? Feynman stressed that NASA officials had been living in a world of unreality.

The Commission reported incredible paperwork sloppiness (P220). They found that half the paperwork was flawed, including 96% of Work Authorization Documents. Why? The Commission stated categorically, "The system . . . is an impediment to good work and good records." Has anything changed?

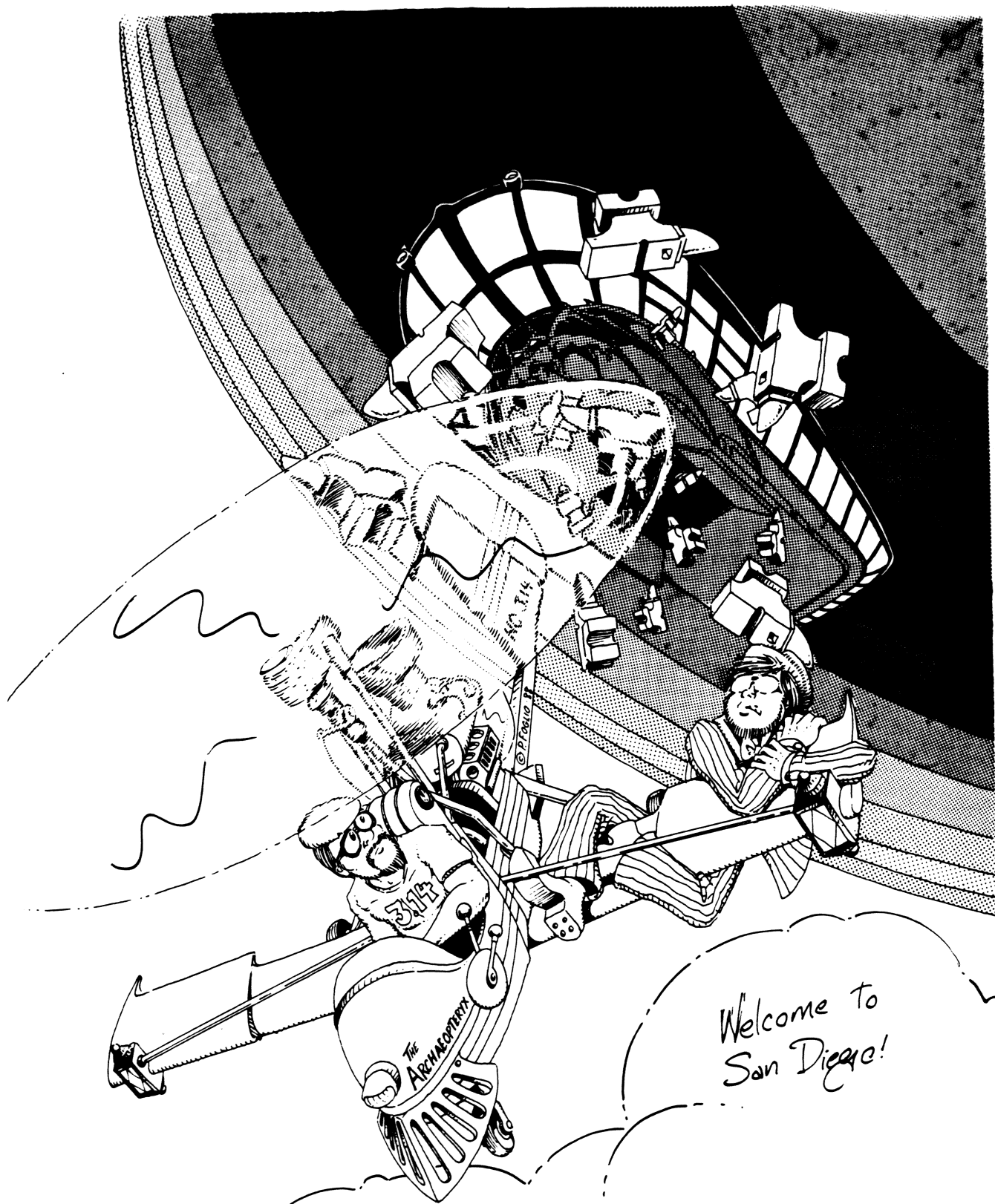
It was not only the paperwork that was sloppy. The Viton O-rings were specified for use between -30°F and +500°F but NASA never seems to have tested them.

It is not clear that any of the people responsible for all of this sloppy work, poor management, political sleaze and unreality have paid for it. Certainly not Fletcher or Myers or Young. Certainly not NASA or Thiokol, who have received millions more as a result of the Challenger incident. (I do not call it an accident. It was a disaster waiting to happen.) The people who were punished were Roger Boisjoly and Allan McDonald, who tried to prevent the disaster.

It is clear that another investigation, run by engineers, not lawyers, might be in order, maybe even a book with a lot of the photographic evidence left out of the Commission report.

The final words of Feynman's report are important: "For a successful technology, reality must take precedence over public relations, for nature cannot be fooled." **DS**

Dr. Yale Jay Lubkin, a freelance EW consultant who helped the Israelis establish their RPV program, is our Electronic Warfare Editor.



Welcome to
San Diego!

FROM
Bill and Barry -
The Heterodyne Boys and PHIL FOGLIO

ROCKETDYNE REBORN

Recent events have led to revision of US space launch policy and a new demand for expendable launch vehicles (ELVs). Rocketdyne, the largest producer of rocket engines outside of the USSR, is ready to provide the engines necessary to meet the demands of the US mixed fleet strategy and an emerging commercial launch industry.

Rebirth of ELV industry

In 1986, successive launch failures of the national Space Transportation System (STS), the Titan 34D, and the Delta temporarily grounded America's launch systems. This left the United States without access to space for medium and heavy payloads.

Recognising the seriousness of the situation, the US Department of Defense quickly formulated a National Space Launch Recovery strategy which called for the procurement of a diverse stable of launch vehicles to supplement the national Space Transportation System fleet of reusable Shuttles. By January 1987, less than one year after the ill-fated STS 51L mission, implementation of the strategy had been initiated with the ordering of additional Titan IV Complementary Expendable Launch Vehicles (CELVs), refurbished Titan IIs and the Delta II Medium Launch Vehicle.

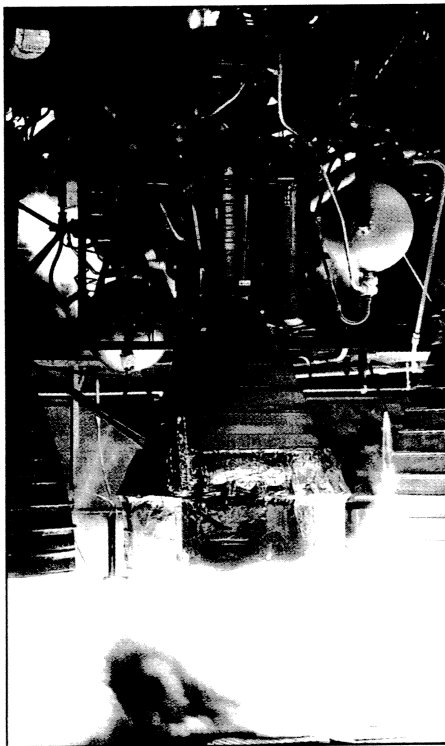
Concurrently, the National Aeronautics and Space Administration (NASA) completed a mixed fleet study and in May 1987, formally announced that future procurements will be made of launch services using expendable launch vehicles. These ELV launches will supplement STS flights for those scientific and government payloads that are not unique to the Shuttle or where a manned presence is not required.

The grounding of the American launch fleet also increased demand for launch services for commercial launch payloads. A near-term market demand for commercial launch services has arisen from the backlog of spacecraft previously reserved on the STS, but removed from the STS manifests by President Reagan's August 1986 prohibition of future commercial Shuttle payloads. This commercial demand has

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prepares for the future.

been exacerbated by the continued delay in the return to flight of Ariane and the desire of international users for an alternative to Arianespace.

In 1986, US government directives were issued to implement the President's executive orders and the Congressional Act of 1984 to encourage the commercialisation of launch services. These actions allowed specific private companies the right to offer Delta, Atlas, and Titan rockets for commercial payloads



An MA-5 cluster is test fired at Rocketdyne's field test centre in the Santa Susana mountains to the northwest of the company's Canoga Park, California factory.

and the operators to use government facilities and services on a direct cost basis.

As a result of these events, the US has started to establish a diverse stable of space launch systems to meet the goal of assured access to space for critical government and national security payloads. The launch vehicles currently operational, or in production consist of the Scout, Titan II, Delta, Atlas, Titan III, Titan IV, and the STS. In addition, commercial launch services are being offered with the Delta, Atlas, and Titan III.

Responding to these changes in the market and the needs of its launch vehicle customers, the Rocketdyne Division of Rockwell International has restarted production of Delta and Atlas engines. Interest has also been revived in the ELV engines developed for the heavy-lift Saturn vehicles of the Apollo programme.

Rocketdyne ELV Engines

Rocketdyne was formed as a division of North American Aviation, Inc in Canoga Park, California in 1955 with the charter to design, develop, and manufacture large, liquid-propellant rocket engines. The first major rocket engine produced by Rocketdyne was the propulsion system for the Navaho supersonic cruise missile. In its subsequent 30 years of existence, Rocketdyne has also produced engine systems for the Redstone, Jupiter, Thor, Atlas, Delta, Saturn, and Shuttle Orbiter launch vehicles.

The current Rocketdyne product line of engines that are, or may be used, for expendable launch vehicles are the Atlas MA-5, the Delta RS-27, the Saturn H-1, F-1, J-2 engines, and the Space Shuttle Main Engine (SSME).

Atlas MA-5

The MA-5 is on the current Atlas series. Each MA-5 consists of a cluster of three separate engines, or 'barrels'; a two-engine booster system, surrounding a central sustainer powerplant. The booster engines are designed to be jettisoned from the Atlas following the boost phase, while the sustainer continues operation and remains with the Atlas booster stage.

The current MA-5 engine system provides a total of 438,000 pounds of sea level thrust, with the boosters providing 377,500 pounds of thrust and the sustainer providing 60,500 pounds of thrust. Two 670-pound thrust vernier engines are also a part of the MA-5 system. The booster engine sea level specific impulse is 259 seconds.

Production of the Atlas engine systems occurred from 1956 to 1984. During this period, more than 640 Atlas engine systems were delivered. Overhaul programmes to convert deactivated Atlas intercontinental ballistic missiles into space launch vehicles were also performed for approximately 70 engine shipsets. In late 1986, production of the MA-5 engine system was resumed to support potential commercial and government sales of Atlas/Centaur launch services by the Space Systems Division of General Dynamics Corporation.

Delta RS-27 Engine

The RS-27 is the first stage liquid booster engine used in the current Delta-series of launch vehicles. Earlier Thor and Delta vehicles had Rocketdyne MB-1 and MB-3 engines. The RS-27 is derived from the Saturn H-1 engine and was initially produced using residual H-1 hardware repackaged to fit the Thor/Delta.

The RS-27 engine system, using an 8:1 expansion ratio nozzle, provides a total of 207,000 pounds of sea level thrust at specific impulse of 262 seconds. A modified version of the RS-27 will be produced with a nozzle expansion ratio of 12:1 to enhance engine performance at altitude.

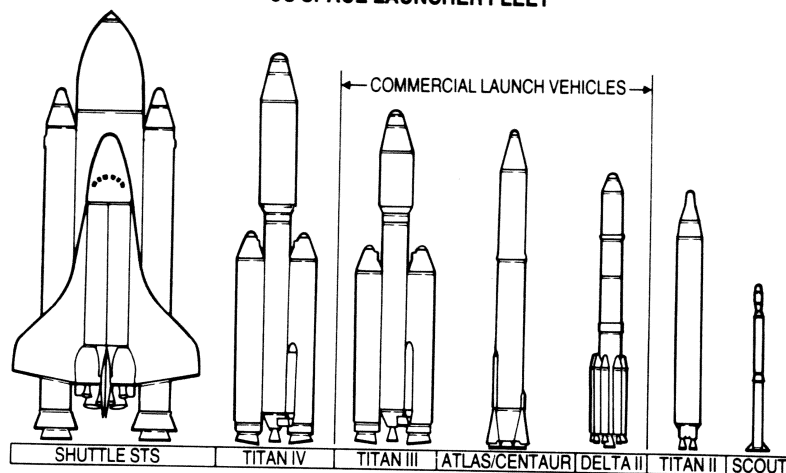
Some 603 Thor and Delta engines have been delivered since 1956 for ballistic missile and space launch vehicles. This includes 81 RS-27 engines which were produced from 1973 to 1984. Production of the RS-27 engines resumed in January 1987 when the McDonnell Douglas Delta was selected by the Air Force as its Medium Launch Vehicle.

Saturn H-1 Engine

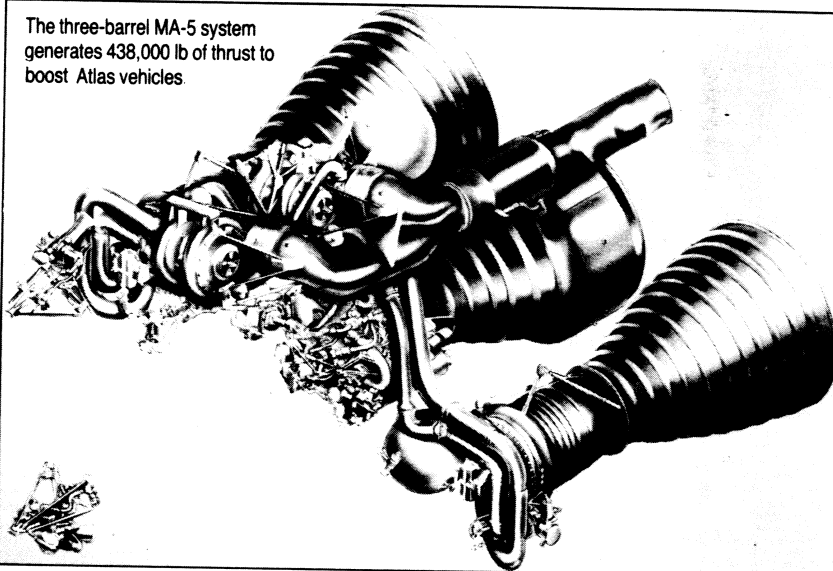
The H-1 engine was used in the first stage of the Saturn IB. In clusters of eight, the H-1 successfully boosted 18 consecutive Saturn IB launch vehicles into low Earth orbit in the Apollo and Skylab programmes. The H-1 was the precursor to the larger F-1 engine and was repackaged as the RS-27 for Thor/Delta applications.

The H-1 engine generates 205,000 pounds of sea level thrust with a specific impulse of 263 seconds. It was in production from 1959 to 1968. Nearly 300 engines were delivered to NASA during this period. However, some of this hardware has been recycled as RS-27s. The basic H-1 engine is not currently in production, except in the RS-27 configuration.

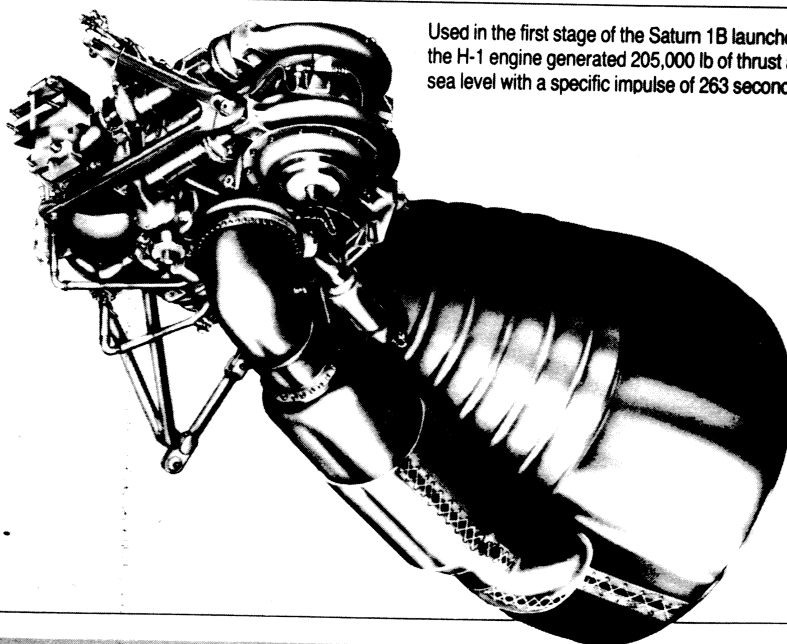
US SPACE LAUNCHER FLEET



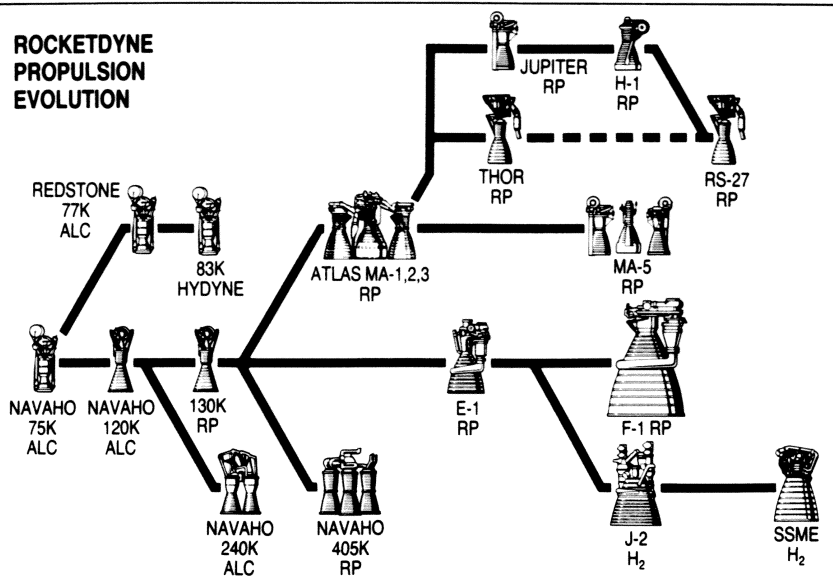
The three-barrel MA-5 system generates 438,000 lb of thrust to boost Atlas vehicles.



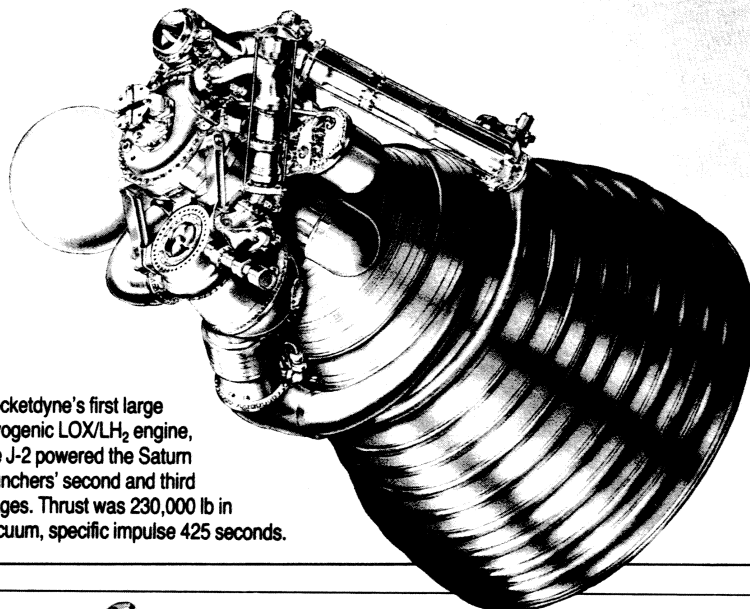
Used in the first stage of the Saturn 1B launcher, the H-1 engine generated 205,000 lb of thrust at sea level with a specific impulse of 263 seconds.



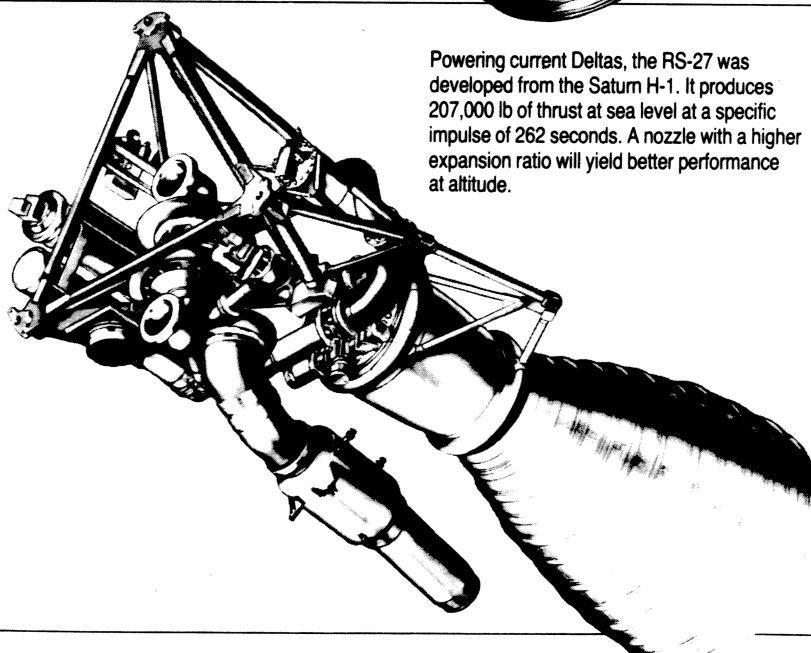
ROCKETDYNE PROPULSION EVOLUTION



Rocketdyne's first large cryogenic LOX/LH₂ engine, the J-2 powered the Saturn launchers' second and third stages. Thrust was 230,000 lb in vacuum, specific impulse 425 seconds.



Powering current Deltas, the RS-27 was developed from the Saturn H-1. It produces 207,000 lb of thrust at sea level at a specific impulse of 262 seconds. A nozzle with a higher expansion ratio will yield better performance at altitude.



Saturn F-1 Engine

The F-1 engine was developed for the Saturn V man-rated launch vehicle used in the Apollo and Skylab programmes. The F-1 is still the most powerful rocket engine ever built, generating over 1.5 million pounds of thrust. The design of this engine reflects major achievements in combustion stability and propellant turbomachinery technology.

Each F-1 generates 1,522,000 pounds of thrust at sea level with a specific impulse of 265 seconds. The F-1s were used in five-engine clusters to provide 7.5 million pounds of thrust for the first stage of the Saturn V launch vehicle. A total of 13 Saturn V launches were performed, with the 65 F-1 engines demonstrating 100% flight reliability.

The F-1 engine was in production from 1963 to 1969, during which time 99 engines were delivered to NASA. Investigations in late 1986 indicated that a set of seven flight spares remain in storage at NASA facilities, and sufficient residual hardware is available to produce, on an overhaul/refurbishment basis, approximately 10 to 15 engines. Although F-1 production tooling and special equipment was scrapped in the early 1970s, engineering and manufacturing documentation exists in Rocketdyne files. However, there are no plans to resume production of the F-1.

Saturn J-2 Engine

The J-2 engine was the first large booster engine designed by Rocketdyne to use liquid oxygen/liquid hydrogen propellants. The technology required to use this cryogenic, low-density fuel in a large engine was successfully demonstrated, and engine production was initiated in 1963.

The J-2 engines were designed for use in the second stage (SII) and third stage (SIVB) of the Saturn launch vehicles. The engines were arranged as a five-engine cluster in the SII stage, and as a single, restartable engine system for the SIVB stage. A total of 85 J-2s were flown in 20 SIVB and 13 SII stages. Since the J-2s were used as upper stages in the Saturn launch vehicles, the nozzle was designed with a high expansion ratio of 27.5:1. Each J-2 engine produced 230,000 pounds of vacuum thrust with a specific impulse of 425 seconds. Development work, including initial hardware testing on 13 development engines, was performed on a simplified version of this engine, called the J-2S, in the late 60s and early 70s.

From 1963 to 1970, 152 J-2 engines were delivered to NASA. Recent investigations indicate that one complete set of Saturn flight spares exist in NASA storage facilities. It is estimated that sufficient residual hardware exists to deliver 15 to 20 J-2 engines on an overhaul/refurbishment basis. As with the F-1, engineering and production documents exist, but there are no plans to resume production.

Space Shuttle Main Engine

The Space Shuttle Main Engine (SSME) is used as the main propulsion system for the STS orbiter. The engine uses cryogenic liquid hydrogen as fuel, and represents a major technology advance over earlier expendable launch vehicle propulsion systems such as the J-2. In particular, it operates at very high chamber pressure, is throttleable, and is designed for reuse in multiple missions.

The SSME can generate up to 512,300 pounds of thrust in a vacuum (408,750 pounds at sea level) with a specific impulse of 453 seconds. It operates with a chamber pressure of 3,260 pounds per square inch, (four times higher than in expendable engines), and can be throttled to operate from 65% to 109% of its rated power level.

The SSME has been in production since 1977. Since then, 27 flight engines have been delivered to NASA. Work is currently underway on the production of four additional engines for the replacement orbiter. With renewed interest in expendable launch vehicles, work is also being conducted at Rocketdyne on the RS-53, an expendable version of the SSME that is being considered for advanced heavy lift launch systems.

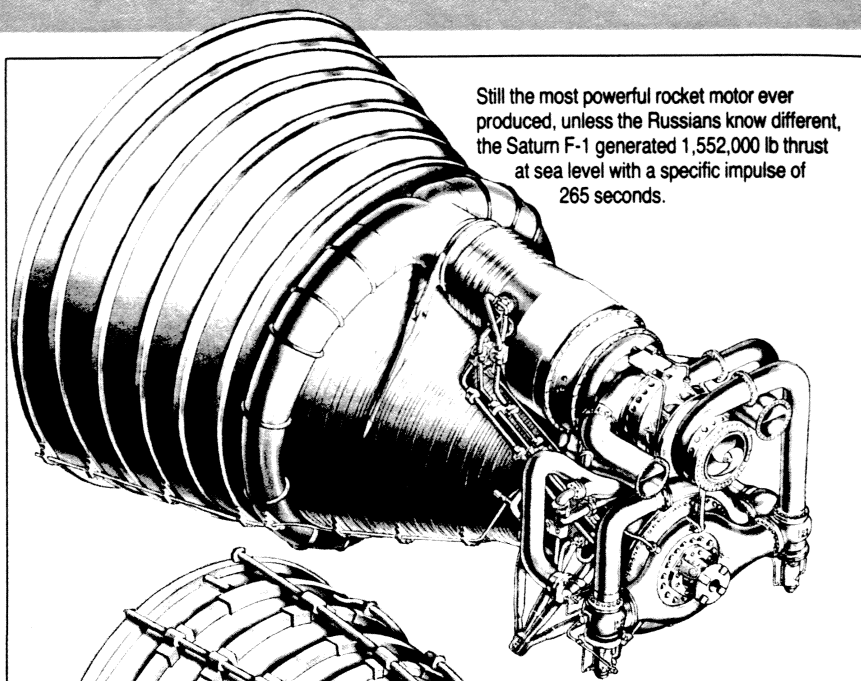
Each of the Rocketdyne engines produced over the past 30 years used the knowledge and experience gained in previous engine development programmes. The initial liquid oxygen/alcohol-propelled Navaho and Redstone engines led to the development of the liquid oxygen/kerosene (RP-1) propellant engines for the Atlas and Thor launch vehicles. These engines provided the basis for development of the H-1, the E-1 (an early R&D large engine), and the F-1 engines for the Saturn launch vehicle. The hydrocarbon-fuelled engine programmes provided the technology base for the development and production of Rocketdyne's liquid oxygen hydrogen propellant J-2 and advanced SSME propulsion systems.

All of the six engine models described above continue to offer superior state-of-art performance (thrust/impulse) in the 1980s. They use non-toxic propellant combinations and can be completely ground tested prior to flight. All are fully developed, qualified, and are flight proven with outstanding reliability records.

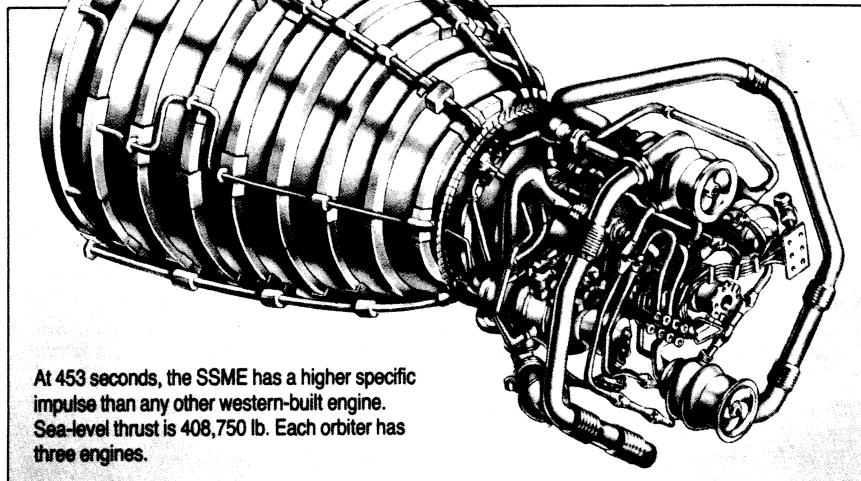
Engine production history

Since 1956, Rocketdyne has produced and delivered 3,218 booster engines for the Redstone, Jupiter, Thor, Delta, Atlas, Saturn, and Shuttle Orbiter. The production delivery history is a reflection of the US military and civil space programmes over the past 30 years.

In the mid-1950s, the division was awarded contracts for engines for the Air Force Thor and Atlas, and the Army Redstone and Jupiter missiles. Using



Still the most powerful rocket motor ever produced, unless the Russians know different, the Saturn F-1 generated 1,552,000 lb thrust at sea level with a specific impulse of 265 seconds.



At 453 seconds, the SSME has a higher specific impulse than any other western-built engine. Sea-level thrust is 408,750 lb. Each orbiter has three engines.

production facilities in Canoga Park, California and Neosho, Missouri, initial delivery of Atlas, Thor, Jupiter, and Redstone engines were made in 1956. The Navaho and Jupiter engines were the basis for a contract from the US Department of Defense's Advanced Research Project Agency for the development of the H-1 engine. In 1958, Rocketdyne received a contract to develop a larger version of the H-1, the 1.5 million pound thrust F-1 engine. By 1959, Rocketdyne engines had already launched a combination of 200 ballistic missiles or research vehicles.

In the period 1956 to 1961, Rocketdyne production output went from less than 50 engines to nearly 400. The bulk of these were for the Thor and Atlas ICBM programmes. Deliveries peaked in 1961 when 390 engines were delivered.

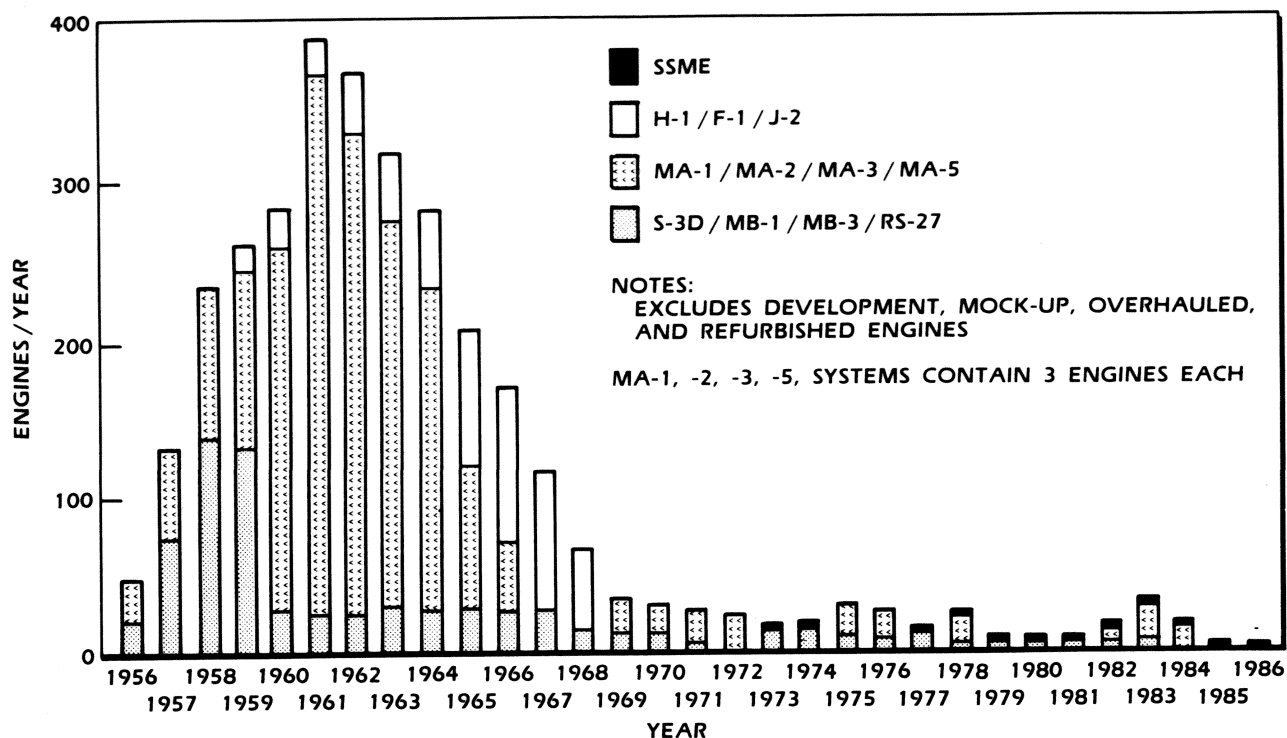
In 1960, as the last Redstone and Jupiter engines were rolled out from the Canoga Park assembly lines, NASA awarded Rocketdyne a contract for work on a new cryogenic propellant (liquid oxygen/liquid hydrogen) engine, the J-2.

In the early 1960s the development milestones for the F-1 and J-2 engines were successfully attained, and these engines proceeded into full-scale production for use in the Saturn launch vehicles. The production delivery rate was maintained at levels of over 200 engines per year through the mid-1960s. In 1963, seven different booster engine models (MB-3 Blk II, MB-3 Blk III, MA-3, MA-5, H-1, F-1, and J-2 engines) were delivered from Rocketdyne manufacturing facilities. However, from 1966 to 1969, the rate dropped precipitously.

In 1968, production of engines for the Thor launch vehicle, the precursor to the Delta space launch vehicle, resumed with a contract for 12 engines from the Department of Defense.

In 1971, Rocketdyne was awarded the contract to develop and produce the SSME. This second generation liquid oxygen/liquid hydrogen engine was the only new large engine production contract awarded in the last 15 years and appeared to mark the beginning of the end for ELV propulsion systems.

NEW ENGINE PRODUCTION DELIVERY HISTORY ROCKETDYNE



A contract was received from NASA in 1972 to produce the RS-27 engine for the Delta, using residual hardware from the H-1 engines. Contracts for additional RS-27s and refurbished/overhauled Atlas MA-3 and MA-5 engine systems were received throughout the 1970s and early 1980s, while production of SSMEs continued. Since 1971, new engine production has never exceeded 35 engines per year. In 1985 and 1986, only two new SSMEs were delivered each year, although production facilities were also used for the Atlas overhaul and Delta RS-27 programmes.

Currently, Rocketdyne maintains engineering and production facilities in Canoga Park, California, and a field test laboratory in the Santa Susana mountains about ten miles northwest of the Canoga Park facilities. Over 1.8 million square feet of office, laboratory, production, and warehousing facilities are under roof.

In 1984, a US \$98-million factory modernisation programme was completed. In addition to an extensive building programme for new engine overhaul, turbopump fabrication, and parts warehousing facilities, a machine tool modernisation programme was undertaken. Basic factory machines such as jig bores, lathes, mills, and electrical discharge machining (EDM) equipment were replaced and/or upgraded with computer numerical control machines and equipment. At the end of the pro-

gramme, the average age of the machine tools had been reduced to eight years from 15 years, and critical new tools, such as robotic welding machines had been installed. The focus of these improvements was to provide the basic productivity and quality enhancing improvements in production operations to keep Rocketdyne competitive.

Future of expendable engines

The changes in the US space launch policies since the Challenger accident have generated renewed interest in Rocketdyne's mature product line of ELV propulsion systems. Current plans indicate that ELVs will be used for government and commercial payloads through the 1990s. In the past year, Rocketdyne has renewed production of RS-27 and MA-5 engine systems for the Delta and Atlas launch vehicles.

Development activities are also being performed for higher performance expendable and partially reusable engines such as the RS-53, and the advanced hydrogen and advanced hydrocarbon booster engines. However, in these cases the desire for higher performance is tempered by the requirement to reduce total system costs.

While future projections appear optimistic for production of additional ELV engines, it is doubtful that booster engine production will ever reach the levels achieved in the 1960s. Therefore,

the renewed interest in ELVs also poses challenges to engine manufacturers such as Rocketdyne. Cost-awareness is of paramount importance as competition for launch service contracts will become increasingly intense.

In the past, Rocketdyne has demonstrated the ability to produce large quantities of reliable, high quality engines quickly. In the future, however, the challenge will be to maintain the technical and quality standards while reducing cost through engineering and production efficiencies. Since production orders are not expected to reach levels where major scale economies are possible, this will, indeed, be a challenge.

Rocketdyne has produced and delivered over 3,200 ELV engines in its 31 years of existence. The company has demonstrated its ability to produce engines in large quantities, at high production rates, while maintaining quality levels that have been demonstrated in an outstanding flight history record. Rocketdyne is ready to supply engines for a re-emerging ELV industry with modernised plant facilities and a management commitment to cost and quality awareness. ☐

About the authors

Paul N Fuller is vice-president of propulsion systems and Henry M Minami Jr is manager of propulsion systems at Rocketdyne.